DOCUMENT RESUME

ED 109 609 CS 002 008

AUTHOR	Berdiansky, Betty; And Others
TITLE	Design for Sequencing Spelling-to-Sound Correspondences in Mod 2 Reading Program, Volume 1 and 11.
INSTITUTION	Southwest Regional Laboratory for Educational Research and Development, Los Alamitos, Calif.
SPONS AGENCY	Office of Education (DHEW), Washington, D.C.
REPORT NO	SWRL-TM-2-71-03
PUB DATE	Jun 71
NOTE	453p.; See CS002006 for related document
EDRS PRICE	MF-$0.76 HC-$23.48 PLUS POSTAGE
DESCRIPTORS	*Beginning Reading; *Phoneme Grapheme Correspondence; Primary Education; Program Descriptions; *Reading Instruction; *Reading Programs; Reading Skills; Research Criteria; *Research Design
IDENTIFIERS	*Model 2 Reading Program

ABSTRACT

The purpose of the study contained in this report is to provide research and design data for the Southwest Regional Laboratory (SWRL) Mod 2 Reading Program, a four-year program (K-3) for teaching reading skills to primary-grade children. The report is divided into two volumes. Volume one describes sequencing and methodology, and the specific rule sequences developed for the Mod 2 Reading Program; volume two lists all words (including irregularly spelled words and proper names) sequenced by and within the rules. The design of the program is based on the premise that pupil knowledge of the phoneme grapheme correspondences of English orthography and pupil ability to apply these correspondences are essential. A set of correspondence rules was developed from a 9000-word lexicon to systematically organize instruction for beginning reading. With the aid of computer sorting procedures, rules and rule exemplars were sequenced according to criteria of productivity, regularity, generalizability, and phonological equivalence. (Author/RB)

****
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
****

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

ED109609

SWRL
SOUTHWEST REGIONAL LABORATORY
TECHNICAL MEMORANDUM

DATE: June 4, 1971

NO. TM-2-71-03 Volume I

SCOPE OF INTEREST NOTICE
The ERIC Facility has assigned this document for processing to: CS IR

In our judgement, this document is also of interest to the clearinghouses noted to the right. Indexing should reflect their special points of view.

DESIGN FOR SEQUENCING SPELLING-TO-SOUND CORRESPONDENCES IN MOD 2 READING PROGRAM

Betty Berdiansky, George Stanton, and Bruce Cronnell

ABSTRACT

From a 9000-word lexicon, a set of spelling-to-sound correspondence rules was developed to systematically organize instruction for beginning reading. With the aid of computer sorting procedures, rules and rule exemplars were sequenced according to criteria of productivity, regularity, generalizability, and phonological equivalence.

This report is in two volumes: Volume I describes sequencing criteria and methodology, and the specific rule sequence; Volume II lists all words (including irregularly-spelled words and proper names), sequenced by and within rules.

CS 002 008

This document is intended for internal staff distribution and use. Permission to reprint or quote from this working document, wholly or in part, should be obtained from SWRL, 11300 La Cienega Boulevard, Inglewood, California, 90304.

TABLE OF CONTENTS

Volume I

Introduction 4

- Identification of the lexicon 4
- Development of spelling-to-sound correspondence rules 5
- Statement of task 8
- Program implications and advantages 9

Section I General sequencing criteria and methodology 12

- Development of rule sequence for Block I 12
- General sequencing criteria 13
- Rationale for block, unit, and year divisions 15
- Computer processing of sequence, rules and exemplars 18
- Within-rule sequencing criteria 20
- Irregular words 21
- Grapheme pronunciation variability 24

Section II Specific rule sequence, criteria, and comments 27

- Summary of rule sequence 27
- Detailed discussion of rule sequence 35
  - First Year 35
  - Second Year 55
  - Third Year 84
  - Fourth Year 106

Appendices

- A. Key to pronunciation and symbols 120
- B. Glossary 123
- C. Spelling-to-sound correspondences: Rule descriptions, exemplars, position in sequence 126
- D. Alphabetical list of rules and pronunciations 137
- E. Content and sequence of Block I 140
- F. WORDLIST: Computer program for sequencing rules of correspondence 154
- G. CORRECT: Computer program update 170
- H. Regular and irregular pronunciations of graphemes 177

References 213

DESIGN FOR SEQUENCING SPELLING-TO-SOUND CORRESPONDENCES IN MOD 2 READING PROGRAM--VOLUME II

Introduction[1]

The design of the reading component of the Southwest Regional Laboratory's Communication Skills program is based on the premise that pupil knowledge of the spelling-to-sound correspondences of English orthography and ability to apply these correspondences is essential for success in reading words not previously introduced in instruction. To meet the design requirements implied, it was necessary to specify the spelling-to-sound correspondences for an age-graded lexicon appropriate to beginning readers, and to organize them for use in beginning reading instruction.

The spelling-to-sound correspondences were specified in Berdiansky, Cronnell, and Koehler (1969) and further elaborated in Cronnell (1971) and in the present report (see especially Volume I, Section II). These correspondences were applied to an age-graded lexicon appropriate to beginning readers (Berdiansky *et al.*, 1969).

Criteria for organizing and sequencing these correspondences for instruction were proposed by Desberg and Cronnell (1969). The proposals were limited in that primary vowels, secondary vowels and consonants were sequenced separately and in that the sequence was not applied directly to the lexicon. The activity reported here resulted in a design for a combined sequence of correspondences for primary vowels, secondary vowels, and consonants, applied to the Berdiansky *et al.* (1969) lexicon.

Volume I of this report describes the criteria and methods used in designing the sequence of correspondence rules[2] (see especially Section I). This rule sequence is described in detail in Volume I, Section II, and is summarized in Appendix C.

After the rule sequence was established, the words in the Berdiansky *et al.* (1969) lexicon were arranged in the sequence, such that each word was introduced as an exemplar of only one correspondence, all other correspondences in the word having been previously introduced. This arrangement of words according to the rule sequence was done by hand and by computer, and is described in greater detail in Volume I, Section II.

---

[1] For their assistance in the preparation of this volume we wish to thank the Product Design secretarial staff, particularly Gloria Wellman, who typed (and retyped) these word lists. Richard Anguilly of Product Integration prepared and executed the sequencing of words by computer for Section II.

[2] This sequence also contains affixes, compounds, and stress patterns; for convenience, however, it is simply referred to as the rule sequence.

The exemplar words for each rule (or affix, compound or stress pattern) were also sequenced for predicted ease of presentation and learning of the specific rule. The criteria for this within-rule sequencing are presented in Section I of this volume. Section II contains the actual words sequenced by rule and within rules; this establishes the design for beginning reading instruction.

Section III contains those words from the Berdiansky et al. (1969) lexicon which could not be sequenced because of irregular spelling-to-sound correspondences. Proper names from Cronnell (1969a) are sequenced in Section IV according to the rule sequence. Other words from the Berdiansky et al. (1969) lexicon which were not provided for in the rule sequence are found in Section V.

Some time after this report was completed, a careful check was made of the Berdiansky et al. (1969) lexicon to determine whether all words had been sequenced. Some errors and a number of omissions were discovered. Rather than making changes in the word lists, these words are listed in the present report as Errata and Addenda.

Appendices include a key to pronunciation and symbols, a glossary, a summary of the rule sequence, and a table listing word frequencies by year and by section of the present volume.

Section I

Criteria for Within-Rule Sequencing

The general criteria for within-rule sequencing is described in Volume I, Section I of this report. The present section details the specific criteria used in the word lists in Volume II, Section II, where exemplars of each rule are divided into a number of sections. Each section is indicated by a number or a letter or by a combination of number and letter, which rank the exemplars (lowest number and first letter with highest priority) for predicted ease of presentation and learning of a rule.

In this report, several general criteria have been most commonly used for ranking exemplars:

1) Position of grapheme unit: initial, final, medial, in that order of difficulty;

2) Number of syllables: more syllables mean greater difficulty;

3) Frequency: a more frequent environment offers more exemplars for presentation;

4) Where applicable, rule exemplars, within a section can be further subgrouped in the following order of descending preference:

   a. exemplars containing single consonants,
   b. exemplars containing geminate consonants,
   c. exemplars containing digraphs (e.g., sh, ch, etc.),
   d. exemplars containing consonant clusters;

5) Where applicable, rule exemplars within a section can also be further subgrouped in the following order of descending preference:

   a. exemplars containing short vowels,
   b. exemplars containing ee,
   c. exemplars containing long vowels,
   d. exemplars containing secondary vowels;

6) The pronunciation of the vowel(s) in an exemplar will be somewhat affected by the consonant it precedes if that consonant is r, l, or a nasal (n, m, ng).

When there is no criterion for division, or when the number of exemplars is low, words have been alphabetized. Within each section, words are also alphabetized.

~~35~~6

In addition, three specific sets of criteria have been used with rules throughout the four-year sequence: "general position criteria," "special position criteria," and "R criteria."

General position criteria

The "general position criteria" are given below, with the underlined $\underline{C}$[3] or $\underline{V}$ as the grapheme unit being taught.

Consonants (one-syllable words):

1a = $\underline{C}V$ 2a = $V\underline{C}$ 3a = $\underline{C}VCC$ 4a = $C\underline{C}V(C)$ 5a = $C\underline{C}V(C)$
1b = $\overline{\underline{C}}VC$ 2b = $C\overline{V}\underline{C}$ 3b = $\overline{C}CV\underline{C}$ 4b = $\overline{(}C)VC\underline{C}$ 5b = $(\overline{C})V\underline{C}\overline{C}$
4c = $\underline{C}CVC\overline{C}$ 5c = $C\underline{C}VC\overline{C}$
4d = $\overline{C}CVC\underline{C}$ 5d = $C\overline{C}V\underline{C}C$
5e = $CCC\overline{V}$.. or ..VCCC

Vowels (one-syllable words):

1a = $\underline{V}$ 2a = $C\underline{V}$ 3a = $\underline{V}CC$ 4a = $C\underline{V}CC$ 5a = $CC\underline{V}CC$
1b = $\overline{\underline{V}}C$ 2b = $C\overline{\underline{V}}C$ 3b = $\overline{C}C\underline{V}$ 4b = $C\overline{C}\underline{V}C$ 5b = $CC\overline{C}\underline{V}$.. or ..$\underline{V}CCC$

Consonants and vowels (multisyllable words):

6a = two-syllable compounds
6b = two-syllable words formed by adding affixes to one-syllable words

7 = two-syllable words
  a = grapheme unit initial
  b = grapheme unit final
  c = grapheme unit medial

8a = three-syllable compounds
8b = three-syllable words formed by adding affixes to two-syllable words

9 = three-syllable words
  a = grapheme unit initial
  b = grapheme unit final
  c = grapheme unit medial

10a = four-syllable compounds
10b = four-syllable words formed by adding affixes to three-syllable words

---

[3] For explanation of the symbols and terms used in this report, see Appendices A and B.

When the "general position criteria" are used, final silent e is treated as a C unless otherwise noted, since the criteria do not provide for two vowels in a word. When all words involved have a final silent e (e.g., in Block 6), it is excluded, since it does not differentiate words.

In the "general position criteria" and in other within-rule sequencing criteria, double consonants and consonant digraphs are counted as single C's; e.g., mat, mass, and mash are all considered to be CVC words. Also, secondary vowels are counted single V's; e.g., bet, beat, and beet are considered to be CVC words.

Special position criteria

The "special position criteria" are a modification of the "general position criteria" for vowels, with criteria collapsed, used in a few cases:

i = #(C)V...
ii = #(C)CCV...
iii = two-syllable compounds;
two-syllable words formed by adding affixes to one-syllable words
iv = other two-syllable words

R criteria

The "R criteria" are used in addition to other criteria for vowels before r, because of the greater difficulty of Vr sequences:

i = vowel not in the environment /__r
ii = vowel in the environment /__r

Criteria for Within-Rule Sequencing of First- and Second-Year Word Lists

Blocks 1-4		general position criteria[4]
Block 5		
5,1		alphabetical
5,5		general position criteria
Block 6		general position criteria, with final silent e excluded (e.g., name = CVC); R criteria
Block 7		
7,1		general position criteria, with final silent e excluded (e.g., face = CVC)
Block 8		
8,1		1 = vowel Rule 11 at end of compound 2 = vowel Rule 11 in first part of compound 3 = other
8,2	A16, I16, U16, E16	1 = /#__ 2 = other
	O16	1 = /#__ 2 = con- 3 = other

---

[4] In 1,1 these criteria were modified because of the introduction of five rules at once:

1 = VC
2 = CVC
3 = (C)VCC

Block 9

9,1 general position criteria, with r as part of the vowel (e.g., or = V)

9,2 E21
1 = base + er
a = $\left\{ \begin{matrix} CC \\ VC \end{matrix} \right\}$ + er
b = C + Cer
2 = unstressed final er
a = $\left\{ \begin{matrix} VCer \\ C_1C_2er^5 \end{matrix} \right\}$
b = C_1C_1er
3 = #Cer
4 = seconuary stressed er(C)#

U21, I21, A21
1 = compounds
2 = other

021
1 = compounds
2 = er#
3 = other

9,3 general position criteria, with r as part of the vowel (e.g., word = CVC)

Block 10

10,1 I17
1 = ish#
2 = iC#
3 = iCC#

U17
1 = us#
2 = other

E17
1 = base + ness/less
a = -ness
b = -less
2 = base + en/ed
a = -en
b = -ed
3 = other words with ess, en, ed

---

[5] The notation C_1C_2 indicates two different consonant letters, while C_1C_1 indicates two occurrences of the same letter.

a = ess
b = en
c = ed
4 = et#
5 = el#
6 = other

A17 1 = -man
2 = a#
3 = al#
4 = other (not /__r)
5 = ar(C)#
a = ar#
b = arC#

017 1 = on#
2 = other (not /__r)
3 = or(C)#

10,2 Y17 1 = base + ly
2 = base + y
$a = \left\{\begin{matrix}CC\\VC\end{matrix}\right\} + y$

b = C + Cy
3 = numbers
4 = other
a = C_1C_1y
$b = \left\{\begin{matrix}VC\\C_1C_2\end{matrix}\right\} y$

LE22 1 = C_1C_1le
$2 = \left\{\begin{matrix}VC\\C_1C_2\end{matrix}\right\} le$

10,3 alphabetical

10,4 I16 1 = in-
2 = dis-
3 = other

U16 1 = un + base
2 = other

A16, 016, E21, 021, EE10

alphabetical

10,5 A17 1 = a + base
2 = #a
3 = other

E17 1 = ex-
2 = #e
3 = other

017 1 = con-
2 = com- and col-
3 = pro-
4 = other (not /__r)
5 = #Cor

U17, I17 alphabetical

Block 11

11,1 1 = base + ing
2 = -ing#
3 = other

11,2 general position criteria

11,3 general position criteria

11,4 general position criteria

11,5 GG10 1 = one-syllable words; compounds
2 = other two-syllable words

CC10 alphabetical

11,6 1 = one-syllable words
2 = nger#
3 = other two-syllable words

Block 12

12,1 general position criteria

12,2 EA11[6]

1 = environments applying to EA11, but not to EA31
- a = /__#
- b = /__l
- c = /__m
- d = /__ch
- e = /__p
- f = other

2 = environments applying primarily to EA11, but also to EA31 (and/or EA33 and/or EA40)
- a = /__r
- b = /__t
- c = /__k
- d = /__n
- e = /__st

3 = environments applying fairly equally to EA11 and EA31
- a = /__d
- b = /__f
- c = /__v
- d = /__th

plus special position criteria

EA31[6]

1 = /__lth (environment applying to EA31, but not to EA11)

3 = environments applying fairly equally to EA31 and EA11
- a = /__d
- b = /__r
- c = other

plus special position criteria

12,3 0011[6]

1 = environments applying to 0011, but not to 0012
- a = /__#
- [illegible] = /__n

---

[6] In both 12,2 and 12,3 (and similarly in 13,3; Rule 024) there are two rules for two different pronunciations of the same secondary vowel, and the following criteria are used:

1 = environments applying to the rule under consideration, but not the other rule;
2 = environments applying primarily to the rule under consideration, but also to the other rule;
3 = environments applying fairly equally to both rules.

c = /__m
d = /__p
e = /__th
f = /__st
2 = /__l (environment applying primarily to 0011, but also to 0012)
3 = environments applying fairly equally to 0011 and 0012
a = /__t
b = /__d
c = /__f
d = /__r
e = /__k
plus special position criteria

0012[6]
2 = /__k (environment applying primarily to 0012, but also to 0011)
3 = environments applying fairly equally to 0012 and 0011
a = /__d
b = /__t
c = /__l
d = /__f
e = /__p
plus special position criteria

12,4 general position criteria

Block 13

13,1 031 general position criteria

U31
1 = one-syllable words
2 = base + ful
3 = other two-syllable words

13,2 A23
1 = /__ll
2 = /__lt
3 = /__ld
plus special position criteria

023
1 = /__ll
2 = /__ld
3 = /__lt
plus special position criteria

13,3 122
1 = /__nd
2 = /__ld
plus special position criteria

024[6]

- 1 = environments applying to 024, but not to any other rules for o
  - a = /__ng
  - b = /__g
  - c = /__ff
  - d = /__ft
  - e = /__nk
- 3 = environments applying to 024 and also to other rules for o
  - a = /__ss
  - b = /__st
  - c = /__th
- plus special position criteria

Block 14

14,1

- 1 = dge(#)
  - a = one-syllable words
  - b = compounds
  - c = two-syllable words
- 2 = nCe#
  - a = nge#
  - b = nce#
  - c = nse#
    - i = one-syllable words
    - ii = two-syllable words
- 3 = lCe
- 4 = other
  - a = one-syllable words
  - b = two-syllable words

14,2

- 1 = rse#
- 2 = rve#
- 3 = rge#

14,3

- 1 = nce#
- 2 = Vge#
- 3 = Vce#
- 4 = other VCe#
- 5 = other VCCe#

Criteria for Within-Rule Sequencing of Third-Year Word List

Block 15

15,1		alphabetical
15,2		second-year sequence

Block 16

16,1		general position criteria; R criteria
16,2		general position criteria; R criteria
16,3	OE10	1 = one-syllable words 2 = two-syllable words
	OA10	general position criteria; R criteria
16,4		general position criteria
16,5		general position criteria
16,6	UE10	general position criteria
	UI10	1 = one-syllable words 2 = compounds 3 = two-syllable words
	EW10	general position criteria

Block 17

17,1		alphabetical
17,2	-er	1 = VII, Cɇ + er 2 = other VCɇ + er 3 = lɇ (LE22) + er 4 = y [ay] → i [ay] + er
	-en	alphabetical
	-ing	1 = VII, Cɇ + ing 2 = other
	-y	1 = VII, Cɇ + y 2 = other

-s 1 = s → [z], [s]
    a = one-syllable words
    b = compounds
    c = two-syllable words
    d = f (singular) → v (plural)
  2 = (e)s → [əz]
  3 = y → i+es

-ed 1 = C+(C)ed
    a = [d], [t]
      i = one-syllable words
      ii = two-syllable words
    b = [əd]
  2 = CV$\cancel{e}$+ed
    a = [d], [t]
      i = one-syllable words
      ii = two-syllable words
    b = [əd]
  3 = y → i + ed

17,3 -er 1 = two-syllable base + er
    a = no change in base
    b = $\cancel{e}$
  2 = compounds
    a = no change in base word
    b = $\cancel{e}$

-en, -ing, -ed alphabetical

-ly 1 = no change in base
  2 = y [i] → i [ə] + ly
  3 = ful + ly

Block 18

18,1 E13 1 = re-
  2 = be-
  3 = de-
  4 = e-
  5 = pre-
  6 = other two-syllable words
  7 = three-syllable words

O13 1 = o
  2 = pro-
  3 = Co-
  4 = CCo-
  5 = three-syllable words

A13
1 = two-syllable words
2 = three-syllable words

I13
1 = i-
2 = Ci-
3 = CCi-
4 = three-syllable words

U13
1 = (C)u-
2 = CCu-
3 = three-syllable words
plus R criteria

18,2 S20
general position criteria; final silent e excluded (e.g., nose = CVC)

S21
1 = -ouse
  a = one-syllable words
  b = two- and three-syllable words
2 = -ase
  a = one-syllable words
  b = two- and three-syllable words
3 = -ease
4 = -oose

18,3
1 = arV
2 = arrV
3 = other

18,4
1 = one-syllable words
2 = two-syllable words; first syllable stressed with a vowel 13 rule
3 = two-syllable words; first syllable stressed with other vowel rule
4 = two-syllable words; second syllable stressed

Block 19

19,1 -ment
1 = base + ment
2 = other

-or
1 = no change in base
2 = $\cancel{e}$

-ive
1 = no change in base
2 = changes in base

-ness
1 = no change in base
2 = y → i [i] + ness

-ance/-ant
1 = no change in base
2 = changes in base
3 = other

19,2 IE11
1 = one-syllable words
2 = two-syllable words

I24 + GH10
general position criteria, with gh as part of the vowel (i.e., igh = V)

[illegible]10
1 = gh#
2 = ght#
3 = two- and three-syllable words

H20
1 = $h \rightarrow \emptyset \,/\, \#\_\_$
2 = $h \rightarrow \emptyset \,/\, \_\_\#$
3 = $h \rightarrow \emptyset \,/\, \_\_V_{\text{unstressed}}$

19,3 K20
general position criteria, with kn as a consonant (e.g., knit = CVC)

G20
1 = #gn
2 = gn#
  a = ign (Rule I22)
  b = other

W20
general position criteria, with wr as a consonant (e.g., wring = CVC)

19,4
general position criteria, with mb as a consonant (e.g., lamb = CVC)

19,5 L20
1 = -alk (Rule A23)
  a = one-syllable words
  b = two-syllable words
2 = -olk (Rule O23)
3 = -alf
4 = -alv
5 = -alm

T20
1 = -stle
2 = -sten
3 = -ften

19,6
1 = one-syllable words
2 = two-syllable words

Block 20

20,1 -y
1 = no change in base
2 = ¢
3 = other

-ful alphabetical

-al 1 = no change in base
2 = ɇ

-able 1 = no change in base
2 = ɇ (optional)

-eth, -less, alphabetical
-ist, -ish

20,2 general position criteria

20,3 1 = -ther
a = two-syllable words
b = three-syllable words
2 = -thern
3 = -the

20,4 1 = two-syllable words
2 = three-syllable words

Block 21

21,1 alphabetical

21,2 1 = two-syllable words
2 = three-syllable words, no changes
a = base + ion
b = other
3 = ɇ + ion
4 = base + ation
a = no change in base
b = ɇ
5 = miscellaneous changes in base
6 = tion + al
7 = tion → [čən]/s__

21,3 -sion → [šən]

1 = -ssion
a = two-syllable words
b = three-syllable words
i = no change in base
ii = t + ion → ssion
iii = other
2 = -sion/C__
a = two-syllable words
b = three-syllable words

-sion → [žən]

1 = /V__
2 = /r__
3 = de + ion → sion

a = $V \rightarrow [\bar{V}] \,/\, \_\_ \left\{\begin{matrix} de \\ sion \end{matrix}\right\}$

b = $V \rightarrow [\bar{V}] \,/\, \_\_\, de$
$\rightarrow [\breve{V}] \,/\, \_\_\, sion$

21,4 1 = two-syllable words
2 = three-syllable words

Block 22

22,1 1 = V11,Ce#
a = first vowel: vowel 16 rule
b = first vowel: other vowel rule
2 = Y19#
3 = V15,C(C)(e)#
4 = other

22,2 1 = Y17#
2 = LE22#
3 = V17,l#
4 = V17,r# or E21, r#
5 = A17#
6 = V17,C#
7 = V17,CC#
8 = V17,C(C)e#

22,3 1 = A17#
2 = V17,r# or E21,r#
3 = 025#
4 = V17,C(C)#
5 = V17,l# or LE22#
6 = other

22,4 1 = EE10,(C)#
2 = other

Criteria for Within-Rule Sequencing of Fourth-Year Word List

Block 23

23,1 A29
1 = -aste#
  a = base words
  b = derived words and compounds
2 = -ange# (including derived forms)
3 = -ange...

A24
1 = #wa... (one-syllable words)
2 = #swa...(one-syllable words)
3 = #(s)wa (derived words and compounds)
4 = #(s)wa... (other two- and three-syllable words)
5 = #(s)qua...

23,2 135
1 = /__#
  a = one-syllable words
  b = two- and three-syllable words
2 = -ine#
3 = other

125
1 = -ion
2 = -ior
3 = -ia
4 = view
5 = other

23,3
alphabetical

Block 24

24,1 four-syllable compounds, -ing, -y, -er, -or, -en, -ed
alphabetical

-ly
1 = base + ly
2 = ful + ly

24,2
1 = /__x
  a = two-syllable words
  b = three-syllable words
2 = /__v
  a = one- and two-syllable words
  b = three-syllable words
  c = four-syllable words

24,3
1 = /__C ic
  a = two-syllable words (plus affixes)
  b = three- and four-syllable words
2 = /__C it
  a = two-syllable words (plus affixes)
  b = three-syllable words
3 = /__C ish
4 = /__C id

24,4
1 = base + ity
2 = ¢
3 = other

Block 25

25,1
1 = base + ion
  a = no change in base
  b = ¢
2 = -ation
  a = no change in base
  b = ¢
3 = ¢ + ition [ɪ́šən]
4 = miscellaneous changes
5 = first vowel: [V̄] in base → [V̌] in affixed form (with various changes)
6 = other

25,2 I26
1 = two-syllable words
  a = Ci
  b = CCi
2 = three-syllable words
  a = compounds; affixed words
  b = other

Y26
alphabetical

U26
1 = two-syllable words
2 = three-syllable words

E26
1 = two-syllable words
2 = three-syllable words

A26, O26
alphabetical

25,3 I36
1 = two-syllable words
2 = -io#
3 = -ium#
4 = other three-syllable words
5 = four-syllable words

Y36 alphabetical

25,4 A12 1 = two-syllable words
2 = three- and four-syllable words

I12, Y12, O12, U12

alphabetical

25,5 E14 1 = re-
2 = other

I14, Y14, A14, O14, U14

alphabetical

Block 26

26,1 -able 1 = no change
2 = ce: no change
3 = ɇ
4 = y → i [ay]

-ment alphabetical

-al 1 = no palatalizations
2 = palatalizations

-ness, -ary, -ist

alphabetical

26,2 IE17 1 = base + ie
2 = other

EY17 1 = base + ey
2 = other two-syllable words
3 = three- and four-syllable words

26,3 alphabetical

26,4 general position criteria, with r as part of V (i.e., ear = V)

26,5 general position criteria

26,6 EY10 general position criteria

EI20 1 = eigh# (one-syllable)
2 = eight# (one-syllable)

3 = other one-syllable words
4 = affixed forms and two- and three-syllable words

26,7 -ous
1 = base + ous
2 = ¢
3 = y → i + ous
4 = er → r + ous
5 = non-base
6 = -ous + suffix

OU31 general position criteria

OU35 general position criteria; R criteria

OU33 general position criteria; R criteria

OU34 general position criteria, with gh as part of V (i.e., ough = V)

26,8 general position criteria

Block 27

27,1 un-
1 = -ed#
2 = other

in-, mis-, dis-

alphabetical

27,2 Stress pattern 4A

1 = ia(C)(e)#
  a = ia#
  b = ial#
  c = other
2 = $\left\{\begin{smallmatrix}i\\e\end{smallmatrix}\right\}$um#

3 = Vr(y)#
  a = ior#
  b = Vr#
  c = Vry#
4 = Y17#
5 = -ence/-ent
6 = Vble#
7 = other

Stress pattern 4B

1 = -ate#
2 = other

27,3		1 = -ic# 2 = other
27,4		1 = -ary 2 = other
27,5		alphabetical
27,6	E32	1 = three-syllables → two-syllables a = -ery# b = -erence/-erent c = -ing# d = other 2 = three-syllables → two-syllables + affix 3 = four-syllables → three-syllables
	032	1 = three-syllables → two-syllables a = -ory# b = other 2 = four-syllables → three-syllables 3 = five-syllables → four-syllables
	A32, I32	1 = three-syllables → two-syllables 2 = four-syllables → three-syllables

Section II

Sequenced Word Lists

First-Year Word List

Frequency = 796

Block 1 Frequency = 315

1,1 Frequency = 10

N10, NN10, T10, A15, I15 Frequency = 10

1 an at in inn it

2 tan tat tin

3 ant tint

1,2 Frequency = 11

P10 Frequency = 11

1b pan pat pin pip pit

2b nap nip tap tip

3a pant

5b apt

1,3 Frequency = 40

L10 Frequency = 7

1b lap lip lit

2b pal

3a lint

5a plan

5c plant

LL10 Frequency = 3

2a ill

2b pill till

1,3 (con't) S10 Frequency = 27

1b sap sat sill sin sip
sit

4a slap slat slip slit snap
snip span spat spill spin
spit still

4b its taps

4c slant

5b last lisp list past

5e pants split

SS10 Frequency = 3

2a ass

2b lass pass

1,4 Frequency = 47

D10 Frequency = 14

1b dad did dill din dip

2b lad lid pad sad

3b slid

4b and land sand

4c stand

DD10 Frequency = 1

2b add

1,4 (con't) E15 Frequency = 32

2b dell den led less let
net pen pep pet sell
set tell ten

3a end

4a dent lend nest pelt pent
pest send sent tend tent
test

4b sled sped spell step

5a slept spend spent

1,5 Frequency = 101

M10 Frequency = 32

1b mad man map mass mat
men mess met mill miss
mitt

2a am

2b dam dim tam

3a mast melt mend mist

3b slam slim stem

4b elm

5a smell

5b damp imp lamp limp

5c smelt

5d stamp

5e midst

6a tom-tom

1,5 (con't) B10 Frequency = 28

1b	bad	ban	bass	bat	bed
	bell	bet	bib	bid	bill
	bin	bit			
2b	dab	tab			
3a	band	belt	bend	bent	best
3b	slab	stab			
4a	blab	bled	bless	bliss	
4c	blast	blend	blimp		

U15 Frequency = 41

1b	up	us			
2b	bud	bum	bun	bus	but
	butt	dull	mud	mum	muss
	nut	pun	pup	sub	sum
	sun	sup	tub	tut	
3a	ups				
4a	bulb	bump	bust	dump	dust
	lump	lust	must	pump	
4b	plum	plus	slum	spun	stub
	stun				
5a	plump	stump	stunt		
5e	mumps				

1,6 Frequency = 106

R10 Frequency = 45

1b ram ran rap rat red
rib rid rim rip rub
rum run rut

3a rend rent rest rump runt
rust

5a brad bran brass brat dress
drill drip drum press prim
trap trill trim trip

5c brand primp print tramp trump
trust

5e strand strap strip strum strut

6a rat-tat

H10 Frequency = 22

1b had ham hat hell hem
hen hid hill him hip
hit hub hull hum hut

3a hand held help hemp hint
hump hunt

1,6 (con't) 015 Frequency = 39

1b odd on

2b bob doll dot hop hot
lot mob mom mop nod
not pod pop pot rob
rod rot sob sod sop
top tot

4a bond pond romp

4b blot drop plod plot prop
slop slot spot stop trot

5a blond

5e prompt

Block 2 Frequency = 50

2,1 Frequency = 28

SH10 Frequency = 28

1b sham shed shell shin ship
shot shut

2a ash

2b dash dish hash hush lash
mash mush rush sash

3a shalt

3b blush brush slush smash trash

4a shred shrill shrub

4c shrimp

5e splash

2,2 Frequency = 22

TH13 Frequency = 6

1b than that them then this
thus

TH11 Frequency = 16

1b thud thin

2b bath hath lath math path
pith

3a thump

4a thrash thresh thrill thrush

4b depth tenth

4c thrust

Block 3 Frequency = 51

3,1 Frequency = 40

EE10 Frequency = 36

1b eel

2a bee see tee thee

2b beer beet deed deep deer
heed heel meet need peel
peep peer reed reel seed
seem seen seep sheep sheet
teeth

3b three tree

4b bleed sleep sleet speed steel
steep steer

5e street

E25 Frequency = 4

2a be he me she

3,2 Frequency = 11

Y19 Frequency = 11

2a by my shy thy

3b dry pry sly spy sty
try

6a by-by

Block 4 Frequency = 380

4,1 Frequency = 91

F10 Frequency = 51

1a fee
1b fad fan fat fed feed
feel feet fell fib fill
fin fish fit fun fuss
2a if
2b beef
3a fast felt fifth film fist
fond
4a flap flash flat fled flee
fleet flesh flip flop fly
free fresh fret fry
4b elf self shelf
4c flint
5b left lift raft shaft shift
sift
5d draft drift thrift

FF10 Frequency = 9

2b buff huff muff puff
3b fluff sniff staff stiff stuff

4,1 (con't) W10 Frequency = 31

1a we wee

1b web wed weed weep well
wet will win wish wit
with

3a went wept west wilt

5a dwell sweep sweet swell swill
swim swish tweed tweet twin

5c swept swift twist

5e twelfth

4,2 Frequency = 187

K10 Frequency = 37

1b keen keep kid kill kin
kiss kit

2b leek meek peek reek seek
week

3a kelp kept

4b ask bask desk disk dusk
elk husk mask milk risk
silk sulk task tusk

5a skid skill skim skin skip
skit skull sky

4,2 (con't) N20 Frequency = 34

5b bank bunk hunk ink kink
link mink pink punk rank
rink sank sink sunk tank
thank think wink

5d blank blink brink drank drink
drunk frank plank prank shrink
shrunk skunk slink spank stink
trunk

C12 Frequency = 59

1b cab cad can cap cash
cat cob cod cop cot
cub cud cuff cup cuss
cut

3a camp cast

4a clad clam clan clap class
cliff clip clod club crab
cram crash creed creek creep
crib crop crush cry

4c clamp clasp clump craft cramp
crank crept crest crisp crust

5a scab scat

5b act fact

5c scalp scamp scant

5d tract

5e scrap screen scrub strict

4,2 (con't) CK10 Frequency = 57

2b
back
beck
buck
cock
deck
dock
duck
hack
heck
kick
lack
lick
lock
luck
neck
nick
pack
peck
pick
rack
rock
sack
shack
shock
shuck
sick
sock
suck
tack
thick
tick
tuck
wick

3b
black
block
brick
click
clock
cluck
crack
flock
frock
pluck
prick
slack
slick
smack
smock
speck
stack
stick
stock
stuck
track
trick
truck

5e
struck

4.3 Frequency = 65

G12 Frequency = 65

1b gag gap gas gash god
got gum gun

2b bag beg big bug dig
dug fig hag hug keg
lag leg lug mug nag
peg pig pug rag rig
rug sag tag tug wag
wig

3a gasp gulf gulp

3b crag drag drug flag plug
slag slug snag stag twig

4a glad glass glee glen grab
grass greed green greet grill
grin grip grit grub gruff

4c grand grant grunt

4,4 Frequency = 32

J10 Frequency = 12

1b jack jam jell jet jig
job jot jug

3a jest jump junk just

X10 Frequency = 14

2a ax ox

2b box fix fox mix rex
six sox tax wax

3b flax

5b next sixth

Y10 Frequency = 6

1a ye

1b yak yap yell yes yet

4,5 Frequency = 5

V10 Frequency = 2

1b van

3a vest

Z10 Frequency = 2

3a zinc

6a zig-zag

ZZ10 Frequency = 1

2b buzz

Second-Year Word List

Frequency = 2299

Block 5 Frequency = 68

5,1 Frequency = 36

Compounds Frequency = 36

bathtub
blacksmith
bobsled
cannot
catfish
catnip
chopstick
deerskin
fishpond
flagship
flashbulb
grandstand
gumdrop
hotbed
inkstand
inkwell
inland (P)
instep
lipstick
lockbox
milkman
milkweed
padlock
pickup
pigpen
sandbag
sandman
sheepman
shellfish
shotgun
sunset
teepee
tomcat
uphill
upset (N)
weekend

5,2

The -ing suffix with previously introduced base words.

5,3

The -es suffix (plurals and third-person singular, present tense forms) with previously introduced base words.

5,4

The -ed suffix (past tense) with previously introduced base words.

5,5 Frequency = 32

NG10 Frequency = 32

2b bang ding fang gang

hang hung king lung

rang ring rung sang

sing sung thing wing

3b bring clang cling fling

slang sling slung sting

stung swing swung

5e sprang spring sprung string

strung

Block 6 Frequency = 259

6,1 Frequency = 176

All Frequency = 108

1bi ale ape ate

2bi babe bade bake bale
cake came cane cape
cave dame date fade
fake fame fate gale
game gate gave hate
lake lame lane late
made make male mane
mate name pale pane
pave rake rate rave
safe sake sale same
sane save shade shake
shame shape shave take
tale tame tape vane
wade wake wane wave

2bii bare care dare fare
hare mare pare rare
share ware

4bi blade blame blaze brake
brave crane crate crave
craze drake drape flake
flame frame glade grade
grape grate grave graze

6,1 (con't) plane plate scale skate
slate slave snake spade
spake stake stale state
stave trade

4bii glare scare snare spare
stare

III Frequency = 68

2bi bike bite dike dime
dine dive fife fine
five hide hike hive
kite life like lime
line live (Aj) mile mine
mite nine pile pine
pipe ride rime ripe
rite shine side site
size tide tile time
vine wide wife wine
wipe

2bii fire hire mire tire
wire

4bi bride crime drive glide
pride prize shrine slide
slime smile snipe spike
spine spite stile swipe
tribe twine

5ei sprite stride strike stripe

6,2 Frequency = 83

011 Frequency = 60

1bii	ore			
2bi	bone	code	coke	cone
	dole	dome	dope	dove (Vb)
	hole	home	hope	joke
	lone	mode	mole	mope
	note	poke	pole	pope
	robe	rode	role	rope
	rove	sole	tone	vote
	woke	wove	yoke	zone
2bii	bore	core	fore	more
	shore	sore	tore	wore
4bi	broke	clove	drove	froze
	globe	grove	slope	smoke
	smote	spoke	stole	stone
	stove	throne		
4bii	score	snore	store	swore
5bi	stroke			

6,2 (con't) U11 Frequency = 16

2bi cube** cute** duke dune
June mule** rude* rule*
tube tune

2bii cure** pure**

4bi crude* flute* lume* prune*

E11 Frequency = 3

1bi eve

2bi theme

2bii here

EE10 + E18 Frequency = 4

4b breeze freeze sleeve sneeze

---

* = always pronounced [u]
** = always pronounced [yu]
Unasterisked words may be pronounced either [u] or [yu], but [u] predominates.

Block 7 Frequency = 36

7,1 Frequency = 36

C11 Frequency = 26

1b cell

2a ace ice

2b dice face lace lice
mice nice pace race
rice

3a cent

3b brace fleece grace place
price slice space spice
thrice trace twice

5a scene

5e spruce

G11 Frequency = 10

1a gee

1b gem gin

2a age

2b cage huge page rage
sage

3b stage

7,2 The -s, -d, and -ing suffixes added to words with general primary vowel Rule 11.

Block 8 Frequency = 70

8,1 Frequency = 45

Compounds with rules in Block 5-7 Frequency = 45

1 bathrobe bedtime beehive campfire
classmate cupcake drugstore hillside
inside jumprope keepsake manhole
milkshake nickname pancake ragtime
springtime sunshine tadpole teenage
upside wishbone

2 farewell firefly fireplace fireside
grapevine herein homemade homesick
icebox iceman limeade limestone
livestock paleface pipeline polecat
sagebrush smokestack sparerib stovepipe
tapeline

3 gangplank slingshot

8,2 Frequency = 25

A16 Frequency = 7

1 abscess accent address(N)(P) annex(N)

2 landscape sampan transplant(N)

I16 Frequency = 3

1 index insect

2 picnic

U16 Frequency = 3

1 umpire

2 muskrat suspect(N)

E16 Frequency = 2

2 reptile welfare

O16 Frequency = 10

1 object(N)

2 concrete (P)(AS) conduct(N) content(N)

contest(N) contract(N) convent

3 bonfire compact(N) costume

Block 9 Frequency = 322

9,1 Frequency = 107

A21 Frequency = 40

1b ark arm art

2a bar car far jar

mar tar

2b bard bark barn card

carp cart dark darn

dart farm hard hark

harm harp lard lark

mark marsh park part

shark sharp tart yard

yarn

3b scar star

4b scarf smart spark start

021 Frequency = 26

1a or

2a for nor

2b born cord cork corn

ford fork form fort

forth horn lord morn

north pork port short

sort thorn torn worn

4b sport stork storm

9,1 (con't) U21 Frequency = 15

1b	urn			
2a	bur	fur	purr	
2b	burn	curb	curd	curl
	furl	hurt	turn	
3b	spur			
4a	burnt	burst		
4b	slurp			

I21 Frequency = 14

2a	fir	sir		
2b	bird	birth	dirt	shirt
	third			
3b	stir			
4a	first	thirst		
4b	flirt	skirt	swirl	twirl

E21 Frequency = 12

2a	her	per		
2b	berth	fern	germ	herd
	jerk	pert	term	verb
4b	clerk	stern		

9,2 Frequency = 192

E21 Frequency = 150 (plus agent noun and comparative adjective forms of previously introduced words)

1a

banker bumper burner camper
dresser dweller flyer gusher
hanger helper herder hunter
jumper keeper milker mixer
picker planter printer renter
ringer singer sleeper speller
stinker sweeper thrasher

1b

batter blotter clipper cutter
dipper dropper drummer fibber
flapper gunner potter robber
runner shutter snapper stopper
swimmer thinner trapper winner
zipper

2a

after amber antler aster
blister canter center cinder
cluster cracker enter fender
filter flicker gander ginger
hinder huckster limber lobster
locker lumber master member
mister monster number pester
plaster pucker scamper scatter
shelter silver sister slender
slumber splinter sucker teeter

9,2 (con't) teeter-totter temper tender
thunder timber tinker under
winter yonder

2b banner better bitter bladder
blubber butter copper dinner
flutter fodder gutter hammer
holler inner ladder latter
letter litter manner matter
miller mutter otter patter
pepper pitter pitter-patter
platter rubber rudder setter
shatter skipper slipper spatter
summer supper tatter teller
twitter udder upper

3 perfume termite

4 adverb cistern concert expert
iceberg lantern pattern transfer(N)
western

U21 Frequency = 5

1 sandbur sunburn

2 burdock murmur murder

I21 Frequency = 4

1 birdseed blackbird catbird redbird

9,2 (con't) A21 Frequency = 18

1 backyard barnyard birchbark carfare
farmyard graveyard hardware skylark
starfish streetcar stockyard yardstick
2 barber farmer garter parker
partner starter

021 Frequency = 15

1 cornflake landlord northland popcorn
sandstorm shortcake shortcut shortstop
2 corner former order porter
3 platform torment (N) transport (N)

9,3 Frequency = 23

A25 Frequency = 11

2a war
2b ward warm warn wart
4a warmth
4b dwarf swarm
6a wardrobe warm-up
6b warmer

022 Frequency = 12

2b word work worm worth
4a world worst
6a fireworks framework homework silkworm
workshop
6b worker

Block 10 Frequency = 575

10,1 Frequency = 213

I17 Frequency = 36

1 furnish greenish publish reddish

rubbish selfish varnish

2 anvil attic bandit derrick

goblin hermit horrid margin

martin napkin orbit pencil

pilgrim public pumpkin rabbit

splendid summit tennis tonsil

torrid traffic turnip victim

worship

3 artist dentist district florist

U17 Frequency = 6

1 cactus campus circus fungus

2 album stirrup

10,1 (con't)E17 Frequency = 89

1a darkness gladness illness sadness
sickness

1b careless homeless

2a bitten blacken deepen fatten
flatten harden ridden rotten
sharpen silken sweeten

2b dotted spotted stranded

3a actress harness mattress mistress
princess reckless

3b burden garden happen kitten
mitten pollen sudden

3c wicked

4 anklet basket blanket bonnet
bracelet bucket carpet casket
cricket goblet jacket locket
magnet mallet market midget
packet pallet pellet pocket
puppet racket russet scarlet
skillet tablet thicket ticket
trumpet velvet

5 cancel funnel kennel kernel
mantel nickel parcel pretzel
tassel tinsel tunnel vessel

6 absent current forest garment
harvest hundred object(N) pavement
perfect problem statement subject(N)

10,1 (con't) A17 Frequency = 45

1 brakeman busman fireman foremen
freshman huntsman workman

2 comma extra larva Santa

3 central dental formal moral
normal oral rascal sandal
signal

4 bantam canvas errand gallant
German infant organ pennant
servant

5a burglar cellar collar dollar
grammar nectar poplar vulgar

5b backward blizzard custard forward
homeward mustard standard upward

017 Frequency = 37

1 button cannon canyon carbon
carton common cotton crimson
gallon lesson mutton pardon
person ribbon sermon

2 blossom bottom freedom gallop
hammock hassock mammoth method
pistol scallop seldom

3 actor arbor armor doctor
effort harbor mirror oxford
parlor stubborn tractor

10,2 Frequency = 226

Y17 Frequency = 142

1 badly barely bravely gladly
hardly homely lately likely
lively lonely manly nicely
partly prickly promptly sadly
safely shapely shortly sweetly
swiftly warmly weekly

2a billy bumpy creepy curly
dirty dolly dusty fluffy
fussy fuzzy greedy hilly
horny inky jelly lucky
messy milky needy rocky
rusty sandy silky sleepy
smarty sticky stormy sulky
tarty thirsty thorny thrifty
tricky

2b daddy fatty funny furry
mommy muddy puppy skinny
sunny teddy zippy

3 fifty forty ninety sixty
thirty twenty

10,2 (con't)

4a belly berry biddy bonny

buddy bunny ditty dizzy

dummy ferry golly gully

gunny happy hobby holly

hurry jiffy jolly kitty

lobby mammy middy penny

poppy shabby shinny silly

sorry stubby tabby taffy

tally toddy worry wuzzy

4b army brandy candy cranky

dandy derby empty fancy

frisky gently glory grizzly

handy hungry husky kinky

lanky mercy merry nasty

pantry party perky plenty

safety simply stingy story

sturdy tardy teeny ugly

wobbly

10,2 (con't) LE22 Frequency = 84

1	apple	battle	bottle	bubble
	cattle	coddle	cripple	crippled
	fiddle	gobble	huddle	kettle
	little	middle	muzzle	nibble
	nipple	paddle	pebble	peddle
	puddle	puzzle	raffle	rattle
	riddle	ripple	ruffle	saddle
	scribble	settle	tattle	wabble
2	angle	ankle	beetle	buckle
	bundle	cackle	candle	circle
	crackle	crumble	dangle	dimple
	feeble	freckle	fumble	gargle
	gentle	grumble	handle	jingle
	jungle	kindle	mantle	marble
	needle	nimble	pickle	pimple
	purple	rumble	sample	scramble
	shingle	simple	single	sparkle
	speckle	sprinkle	steeple	stumble
	tackle	tangle	temple	thimble
	tickle	tinkle	trample	tumble
	turtle	twinkle	uncle	warble

10,3 Frequency = 8

Compounds Frequency = 8

herself himself itself myself

northwest upon upset(V,Aj) within

10,4 Frequency = 40

I16 Frequency = 14

1 indent inflate inform insane

inspect intend invent invite

2 disgrace dismiss distress disturb

3 impure mistake

U16 Frequency = 5

1 undress unlace unlock

2 unless until

A16 Freuqncy = 4

accept pastel transplant(Vb) transport (Vb)

O16 Frequency = 2

stockade trombone

E21 Frequency = 4

percent perfect(Vb) perform perhaps

O21 Frequency = 2

cornet torment(Vb)

EE10 Frequency = 9

indeed fifteen fifteenth nineteen

nineteenth sixteen sixteenth thirteen

thirteenth

10,5 Frequency = 88

A17 Frequency = 38

1 aback afar afire alike
alive alone apart ashore
asleep awake awoke

2 abode acute address (Vb) admire
admit adopt adult afford
agree alarm alas alert
amaze annex (Vb) apply arrest
arrive assume attack attend
attract

3 canal lapel manure parade
salon salute

E17 Frequency = 19

1 except excite expect explode
explore express extend

2 entire escape

3 between cement degree describe
respect restore secrete sedan
select shellac

10,5 (con't) 017 Frequency = 24

1 condense conduct(Vb) connect content(Aj)
contest(Vb) contract(Vb)

2 collect command commence compact(Aj,Vb)
complete

3 produce(Vb) progress(Vb) project(Vb) promote
protect provide

4 object(Vb) o'clock polite

5 corral correct forgot forlorn

U17 Frequency = 5

subject(Vb) subtract supply support
suspect(Vb)

I17 Frequency = 2

cigar divide

Block 11 Frequency = 214

11,1 Frequency = 41

NG10 Frequency = 41

1 backing being blessing breeding
camping clipping cutting dashing
dressing drumming ending filling
greeting helping landing licking
meeting mending packing rocking
setting spelling stuffing tatting
thrilling trimming trying warning
wedding willing

2 cunning darling duckling dumpling
herring kindling morning shirting
stocking

3 hangar(P) kingdom

11,2 Frequency = 97

CH10 Frequency = 68

1b chat check cheek cheer
chess chick chill chin
chip chop chuck chug
chum

2b beech much rich such

3a charm chart chest chime
chink chirp choke chore
chunk church churn

3b speech

4b belch bench birch bunch
hunch inch lunch march
munch perch pinch porch
punch ranch torch

4d branch crunch French starch
trench

6a workbench

6b cheery chilly crunchy rancher

7a channel chapter chatter checker
cherry chicken children chipmunk
chubby

7b attach sandwich(P)

7c merchant orchard

10a chitter-chatter

11,2 (con't) TCH10 Frequency = 29

2a itch

2b batch catch(P) ditch fetch
hatch hitch latch match
notch patch pitch thatch
witch

3b crutch Scotch sketch stitch
switch

5e scratch stretch

6a hopscotch

6b catcher(P) pitcher stretcher

7c catchup(P) hatchet kitchen satchel

11,3 Frequency = 23

WH10 Frequency = 23

1a why

1b whack wheel when which
whip whiz whizz

3a whale wharf while whine
whirl white

6a bobwhite whalebone

6b wheeler

7a whimper whinny whisker whisky
whisper

7c awhile

11,4 Frequency = 24

QU10 Frequency = 24

1b quack queen queer quick
quit quiz

3a quake quart quilt quite
quote

5c square squeeze squirm squirt

6a quicksand

6b quicken quickly

7a quarrel quarry quartet quarter

7c banquet squirrel

11,5 Frequency = 19

GG10 Frequency = 17

1 egg eggplant

2 baggage beggar buggy dagger
giggle maggot nugget piggish
ragged rugged shaggy stagger
waggle wiggle wiggly

CC12 Frequency = 2

hiccup soccer

11,6 Frequency = 10

G31 Frequency = 10

1 get gift gig gill
girl

2 anger finger linger

3 forget target

Block 12 Frequency = 478

12,1 Frequency = 49

AY10 Frequency = 49

2a bay day gay hay
jay lay may nay
pay ray say way

3b bray clay gray play
pray slay stay sway
tray

5b spray stray

6a ashtray birthday crayfish daytime
driveway haycock haystack maybe
pathway playmate plaything runway
weekday

6b grayish payment player saying

7b away display midway subway
Sunday(P)

7c crayon layer mayor prayer

12,2 Frequency = 184

EAll Frequency = 141

1ai pea sea tea

ii flea plea

iii peacock peanut seashore seasick

seaweed teacup teapot

1bi deal heal meal peal

real seal

ii squeal steal

iii misdeal really sealskin

iv appeal realize

1c beam seam team

ii cream dream scream steam

stream

iii steamer steamship streamer streamline

sunbeam upstream

1di beach each leach peach

reach teach

ii preach

iii preacher teacher teaching

1e cheap heap leap reap

1fi leash peace

iv beacon eager eagle

12,2 (con't)	2ai	dear	ear	fear	gear
		hear	near	rear	sear
		shear	tear(N)	year	
	ii	clear	smear	spear	
	iii	dearly	earring	near-by	nearly
		smeary	shearer	yearly	
	iv	dreary	weary		
	2bi	beat	cheat	feat	eat
		heat	meat	neat	peat
		seat	wheat		
	ii	bleat	pleat	treat	
	iii	beaten	beater	eaten	heater
		mincemeat	neatly	neatness	
	2ci	beak	leak	peak	weak
	ii	bleak	creak	sneak	squeak
		streak			
	iii	leaky	squeaky		
	2d	bean	lean	mean	wean
	ii	clean			
	iii	beanbag	cleaner	cleanup	meaning
		meanwhile			

12,2 (con't)	2ei	beast	east	feast	least
		yeast			
	iii	northeast			
	iv	Easter			
	3a	bead	lead(Vb)	read(present tense)	
	iii	beaded	leader	reading	
	iv	beadle			
	3bi	leaf			
	iii	leafy			
	3ci	leave	weave		
	3di	heath			
EA31	Frequency = 43				
	1i	health	wealth		
	iii	healthy	wealthy		
	3ai	dead	head	lead(N)	read(past tense)
	ii	bread	dread	spread	stead
		thread	tread		
	iii	bedstead	forehead	heading	homestead
		instead	threadbare		
	iv	ahead	ready	steady	
	3b	bear	pear	tear(V)	wear
	ii	swear			
	iii	bearskin			
	3ci	deaf	death		
	ii	breath	breast	dreamt	sweat
	iii	breastplate	redbreast	sweater	sweaty
	iv	breakfast	heaven	heavy	weapon

12,3 Frequency = 143

0011 Frequency = 89

1ai boo coo moo too
zoo

iv bamboo boohoo igloo shampoo
tatoo

1bi coon loon moon noon
soon

ii spoon

iii forenoon moonbeam noonday noontime
teaspoon

iv balloon cartoon cocoon harpoon
raccoon saloon

1ci boom loom room

ii bloom broom groom

iii bathroom bedroom bloomer blooming
broomstick classroom gloomy lunchroom
playroom roommate stateroom storeroom

1di coop hoop loop whoop

ii droop scoop stoop swoop
troop

1ei booth tooth

iii toothbrush toothpick

1fi boost roost

iv rooster

12,3 (con't)	2i	cool	fool	pool	tool
	ii	spool	stool		
	iii	cooler	foolish	toolbox	
	3aii	boot	hoot	loot	root
		shoot	toot		
	iii	shooter			
	iv	bootee	scooter		
	3bi	food	mood		
	ii	brood			
	iv	poodle			
	3ci	roof			
	ii	proof			
	iii	fireproof			
	3di	moor	poor		
	3eiv	spooky			

12,3 (con't) 0012 Frequency = 54

2i	book	cook	hook	look
	looks	nook	rook	shook
	took			
ii	brook	crook		
iii	bookman	cookbook	cooker	cooky
	crooked	fishhook	hooky	notebook
	scrapbook	textbook	unhook	
iv	booklet			
3ai	good	hood	wood	
ii	stood			
iii	driftwood	firewood	good-by	goodness
	goodwill	goody	manhood	redwood
	woodchuck	wooded	wooden	woodland
	woodpile	woodshed	woodwork	woody
3bi	foot	soot		
iii	barefoot	footstep		
iv	afoot			
3ci	wool			
iii	woolen	woolly		
3di	hoof	woof		
3eiv	whoopee			

12,4 Frequency = 102

OW11 Frequency = 59

1b owe own

2a bow(N) low mow(Vb) row(Vb, N)
show sow(Vb) tow

2b bowl shown sown

3b blow crow flow glow
grow slow snow stow
throw

4b blown flown grown thrown

6a grownup scarecrow showman slowpoke
snowbank snowbird snowdrift snowdrop
snowflake snowman snowstorm

6b bowling grower lowly owner
slowly snowy

7b bellow borrow elbow fellow
follow furrow hollow meadow
mellow minnow morrow pillow
sorrow tallow willow window
yellow

12,4 (con't) OW12 Frequency = 43

1a	ow			
1b	owl			
2a	bow(Vb, N)	chow	cow	how
	mow(N)	now	row(N)	sow(N)
	wow			
2b	down	fowl	gown	howl
	town			
3b	brow	plow		
4b	brown	clown	crowd	crown
	drown	frown	growl	
6a	bowwow	downtown	somehow	uptown
6b	brownish	downy	downward	
7b	allow			
7c	bowel	bower	coward	flower
	howdy	powder	power	shower
	tower	vowel		

Block 13 Frequency = 197

13,1 Frequency = 73

031 Frequency = 38

2b son ton won

4a come done dove (N) love

month none shove some

4b from

5a front glove

6a frontward grandson lonesome someday

something sometime tiresome

6b lovely sonny undone

7a oven

7c above among color compass

cover dozen govern income (P)

Monday (P) nothing shovel welcome

wonder

U31 Frequency = 35

1 bull bush full pull

push puss put

2 armful bashful careful cheerful

cupful dreadful graceful grateful

handful harmful hateful healthful

helpful peaceful playful skillful

spoonful thankful

3 bullet bully bushel bushy

butcher fullback pudding pullman

pulpit pussy

13,2 Frequency = 52

A23 Frequency = 26

1i all ball call fall

gall hall tall wall

ii small stall

iii baseball fallen football hallway

smallpox snowball snowfall

2i halt malt salt

iii halter malted salty

iv altar

3i bald

ii scald

023 Frequency = 26

1i boll poll roll toll

ii troll

iii roller tollgate

2i bold cold fold gold

hold mold old sold

told

ii scold

iii folder golden goldfish holder

molding olden

3i bolt colt jolt

13,3 Frequency = 72

122 Frequency = 21

1i	bind	find	hind	kind
	mind	rind	wind(Vb)	
ii	blind	grind		
iii	binder	blindfold	kindly	kindness
	winding	windup		
2i	child	mild	wild	
iii	grandchild	wildcat	wildly	

024 Frequency = 51

1ai	dong	gong	long	song
	tong			
ii	strong			
iii	dingdong			
iv	along	oblong		
1bi	bog	dog	fog	hog
	log	tog		
ii	clog	frog		
iii	bulldog	doggy	dogwood	foggy
	hotdog	leapfrog		
1ci	off			
iii	blast-off	kickoff	take-off	
iv	coffee	coffin	office	
1di	loft	soft		
iii	hayloft	softly		

13,3 (con't) 1ei honk

3ai boss loss moss toss

ii cross

iii crossing glossy

iv across

3bi cost lost

ii frost

iii frosting frosty

iv ostrich

3ci moth

ii cloth

Block 14 Frequency = 80

14,1 Frequency = 35

Stressed VCCe# Frequency = 35

1a badge bridge dodge edge
fudge hedge judge lodge
pledge

1b hedgehog

1c badger midget

2a chance dance dunce fence
glance lance mince prance
prince since

2ci dense rinse sense

2cii immense nonsense

3 bulge else shelve twelve

4a bronze grippe

4b barrette giraffe

14,2 Frequency = 18

Stressed VrCe# Frequency = 18

1a curse horse nurse purse
verse worse

1b horseback converse immerse

2 carve curve nerve serve
starve

3 charge gorge large urge

14,3 Frequency = 27

Unstressed VCCe# and VCe Frequency = 27

1 absence distance entrance sentence
substance

2 bandage cabbage college cottage
garbage message package passage
village

3 furnace justice lettuce necklace
practice service surface

4 capsule(P) engine fertile injure

5 orange porridge

Third-Year Word List

Frequency = 3213

Block 15 Frequency = 904

15,1 Frequency = 84

8-9 one-syllable words with first-year rules, Frequency = 84

Alps
bluff
brag
breed
brim
brisk
bunt
clank
clash
clef
clomp
cog
crock
deem
disc
dwelt
flank
flask
flunk
flush
fund
gland
gosh
grasp
gull
gust
gut
helm
hiss
jazz
lab
leer
lest
loll
lull
mesh
mid
mint
mock
mull
musk
nun
puck
pulp
pus
plush
rash
scum
sect
seer
sex
sheen
sheer
shod
skeet
slash
sleek
smith
snack
sneer
snub
snug
splint
sprint
spud
steed
stilt
Swiss
tempt
text
theft
throb
vamp
vast
vat
vent
vex
vim
weld
wend
width
yam
yank
yelp

15,2 Frequency = 820

8-9 words with second-year rules, Frequency = 820

Block 5 Frequency = 31

5,1 Compounds

blackjack bobcat buckshot buckskin
cobweb codfish dishpan dishrag
flagstaff grandad grassland handbag
handcuff hemlock humbug jackass
junkman pigskin ramjet ramrod
redskin sheepskin snapshot standstill
sunbath sunfish sunstruck upkeep
upland

5,5 NG10 clung ping

Block 6 Frequency = 41

6,1 All bate blare crape gape
gaze glaze hale maze
rape shale vale

Ill bile file pike prime
sire spire strife swine
thine wile

6,2 Oll bole cope cove doze
drone grcpe pore Rome
rote shone stoke strode
yore

Ull brute lute mute yule

E11 mere mete

EE10 + E18 peeve

Block 7 Frequency = 4

7,1 C11 mace scent vice

G11 wage

Block 8 Frequency = 47

8,1 Compounds

backbone bedside brimstone firebug

glassware hereby hotline lampshade

lifetime red-wing sandstone shipmate

spruce-up

8,2 A16 abstract ally alpine athlete

baptize bankrupt capsize cashmere

mascot pastime shamrock

I16 dictate incline(N) impact insult(N)

kidnap linseed mishap

U16 nutmeg suffix

E16 empire extract(N) textile

O16 bonbon combat(N) combine(N) complex

compress(N) conflict(N) construct(N) contact

contrast(N) convict(N) prospect

Block 9 Frequency = 95

9,1 A21 harsh

021 scorn shorts snort

U21 blur blurt burr cur

surf turf

I21 firm

E21 serf

9,2 E21 blunder butler cancer canker

capper clatter cobbler convert(N)

creeper cruller culvert differ

duster elder feeler finder

gender glimmer glitter hamper

insert(N) jester jobber killer

lifter mid-term permit(N) plotter

popper prosper putter rafter

render rocker scrapper seeker

sherbert shudder slacker slicker

smelter snicker splatter stepper

sticker suffer tamper tanner

tester thriller tinder totter

usher wicker

U21 burlap surplus surname turnpike

I21 birthplace

A21 boxcar firearm hardship marker

parsnip rampart shipyard

021 borax border concord corncob

cornstarch export import leghorn

porthole

9,3 A25 lukewarm warbler warden warlike
warp warpath warship

022 byword

Block 10 Frequency = 321

10,1 I17 antic arctic bobbin classic
fossil frantic garlic gossip
mannish muffin nostril peevish
transit trellis virgin weevil

U17 census citrus

E17 anthem bracket congress corset
crescent dampen dampness darken
emblem empress ferret fireless
flannel fortress hamlet hardness
harmless helmet helpless hornet
hundredth inlet kindred likeness
madness marvel minstrel morsel
picket priceless restless rickets
rocket sadden segment shipment
shorten sleepless sleeveless socket
stillness stricken sullen sweetness
tempest thicken tireless torrent
trinket wireless witness worthless

A17 ballad baseman canvass constant
coral craftsman currant delta
distant drunkard garland gizzard

	herdsman	Holland	instant	Ireland
	jackal	larval	mammal	marshal
	mental	mortal	northward	onward
	pillar	portal	scandal	sportsman
	stanza	sultan	trespass	tundra
	vassal	villa	warrant	westward
017	ballot	beckon	bishop	captor
	castor	custom	error	factor
	falcon	horror	parson	pastor
	ransom	reckon	rector	sexton
	splendor	sponsor	summon	terror
	victor			
10,2 Y17	belfry	burly	caddy	clergy
	crabby	curry	deeply	dimly
	dingy	dory	entry	envy
	filthy	finely	firmly	fleshy
	folly	freely	gentry	glassy
	grassy	gritty	hanky	hardy
	madly	marshy	merely	misty
	mummy	musty	petty	pigmy
	putty	rally	rarely	rudely
	scanty	scurry	scurvy	sentry
	shanty	sickly	sissy	slushy
	speedy	starry	stately	stuffy
	sultry	thickly	trusty	widely
	wintry			

15,2 (con't)

	LE22	ample	babble	brittle	crumple
		curdle	dazzle	drizzle	gamble
		griddle	humble	hurdle	jumble
		meddle	mingle	mumble	nettle
		nozzle	scuffle	shuttle	sickle
		spangle	spindle	startle	strangle
		throttle	tingle	topple	tremble
		trickle			
10,4	I16	disarm	discuss	disgust	dislike
		dispute	distinct	distract	impress
		infect	infest	inflame	inhale
		insert(Vb)	insist	instruct	invade
		invest	misled	misspell	sincere
	U16	submit	subsist	unfit	unfurl
		unhand	unhurt	unkept	unpack
	O16	blockade			
	A16	abduct(P)	adhere(P)	cascade	stampede
		transmit			
	E21	permit(Vb)	perspire		
	O21	ornate			
	EE10	canteen	exceed	foresee	misdeed
		unseen			
10,5	A17	abide	absurd	adapt	adore
		adorn	advice	affect	aflame
		ally(Vb)	amend	ascend	assess
		assist	attempt	award	aware
		career	galore	Japan	

E17	descend	descent	derive	devote
	effect	embrace	emerge	encamp
	endure	enforce	enlist	estate
	exhale	expand	expel	expend
	extract	extreme	extinct	neglect
	secede	seclude	secure	severe
017	combat(Vb)	combine(Vb)	commit	compare
	compress(Vb)	concern	confess	confine
	confirm	conflict(Vb)	consent	consist
	construct(Vb)	consult	contrast(Vb)	convert(Vb)
	convict(Vb)	forbid	forgave	forsake
	oblige	obscene	offend	oppress
U17	suppress	supreme		
I17	brigade			

Block 11 Frequency = 61

11,1 NG10	bedding	dwelling	gangster	inning
	matting	netting	shilling	wording
11,2 CH10	arch	archer	beechnut	chant
	char	charter	cheep	chuckle
	cinch	drench	duchess	enchant
	gulch	hunchback	leech	parch
	parchment	scorch	starchy	
TCH10	clutch	crotch	etch	hemstitch
	pitchfork	snatch	twitch	witchcraft
11,3 WH10	cartwheel	whit	whittle	

11,4	QU10	acquire	conquest	jonquil	quench
		quest	quill	quitter	quorum
		squid	squint	squire	tranquil
11,5	GG10	druggist	luggage	smuggle	snuggle
		struggle	trigger		
	CC12	accord	occur	yucca	
11,6	G31	gilt	hunger		

Block 12 Frequency = 107

12,1	AY10	array	betray	dismay	essay
		fray	gateway	maypole	midday
		portray	rayon	wayside	
12,2	EA11	beading	bleach	bleary	buckwheat
		clearly	cleave	conceal	creaky
		creamy	dean	dreamland	dreamy
		eastern	eastward	eater	fearless
		freak	gleam	glean	meanness
		meantime	meatless	mislead	plead
		reader	seaplane	seaport	seashell
		sneaker	speaker	teat	treatment
		treaty	unclean	veal	weakly
		weakness	zeal		
	EA31	bearer	bearing	bedspread	blockhead
		breastpin	breathless	deadly	dealt
		forbear	spreader	threat	threaten
12,3	0011	bassoon	boob	bridegroom	croon

		doom	foodstuff	gloom	groove
		maroon	monsoon	noodle	ooze
		poorly	roofing	roomer	scoot
		snoop	snooze	spook	woo
	0012	bankbook	brooklet	foothill	footprint
		footstool	forefoot	goodly	goodness
		woodman			
12,4	OW11	billow	blowtorch	blower	burrow
		growth	lowland	mower	mown
	OW12	downstream	Moscow	prowl	rowdy
		scowl	sundown	towel	township
		vow			

Block 13 Frequency = 57

13,1	031	comfort	fearsome	hovel	hover
		London	monk	monthly	someplace
	U31	bullhead	fearful	fully	glassful
		hopeful	pushcart	shameful	shot-put
		sinful			
13,2	A23	handball	install	squall	
	023	ahold	enroll	goldfinch	goldsmith
		molder	stroll	unfold	uphold
		volt			
13,3	122	binder	blinding	childhood	childish
		grinder	grindstone	mankind	unkind
	024	bong	bossy	Boston	broth

15,2 (con't)

bullfrog
costly
crossbar
crossbow
crossword
flog
floss
froth
gloss
Hong Kong
lofty
logger
offer
ping-pong
show-off
softwood

Block 14 Frequency = 56

14,1

advance
avenge
budge
collapse
convince
corpse
densely
dredge
expense
France
glimpse
hence
henceforth
incense
intense
involve
ledge
misjudge
offense
partridge
pence
pulse
response
ridge
sixpence
sledge
solve
trudge
valve
wedge
whence

14,2

barge
commerce
discharge
disperse
divorce
enlarge
force
forge
horsefly
horseless
horseman
largely
serge
surge

14,3

active
bondage
captive
challenge
doctrine
ermine
hostile
instance
mileage
terrace
tonnage

Block 16 Frequency = 488

16,1 Frequency = 135

A110 Frequency = 135

1bi aid ail aim

ii air

2bi bail bait chain fail

faith gain gait hail

jail laid lain maid

mail maim main nail

paid pail pain raid

rail rain sail tail

vain wail wait

ii chair fair hair lair

pair

4ai faint maize paint saint

waist

4bi braid brain claim drain

flail frail grain plain

quail slain snail staid

stain trail train trait

ii stair

5ai quaint

5bi sprain strain strait

16,1 (con') 6ai bandaid bobtail cattail cocktail
hangnail horsetail mailbag mailbox
mailman mainland nailfile railway
raindrop rainfall shirtwaist

ii airedale airline airplane airport
airshaft airship airway armchair
chairman haircut hairnet hairpin
stairway

6bi faithful jailer maiden mainly
painter painting plainly railing
rainy strainer trainer waiter
unpaid

ii airy fairly hairy unfair

7ci acquaint afraid attain await
complain complaint contain daily
dainty drainage exclaim explain
failure gaily maintain mermaid
obtain portrait(P) restrain sailor
sustain tailor traitor waitress

ii affair dairy despair fairy

16,2 Frequency = 98

OU10 Frequency = 98

1bi ouch out

ii our

2ai thou

2bi bout couch foul loud

mouth noun pouch pout

shout south

ii sour

4ai bound count found gouge

hound mound mount pound

round sound wound (Vb: past tense of wind)

4bi cloud crouch proud scout

slouch snout spout stout

trout

ii flour scour

5ai ground

5bi bounce lounge ounce pounce

sprout

6ai background blowout countdown cutout

dugout fairground foreground hideout

lookout outfit outline outplay

output outrage outside outskirts

playground roundup snowbound southeast

southwest without

6bi counter countless cloudy founder

loudly mouthful outer outing

pouter proudly roundish slouchy

soundly

16,2 (con't) 7ai outlet

7ci about account aloud amount
announce around compound council
counsel countess county discount
flounder foundry grouchy pronounce
southward surround

ii devour

16,3 Frequency = 89

OE10 Frequency = 7

1 doe foe hoe toe
woe

2 tiptoe toenail

16,3 (con't) OA10 Frequency = 82

1bi	oak	oat	oath	
ii	oar			
2ai	whoa			
2bi	boat	coach	coal	coax
	foam	goal	goat	load
	loaf	loam	loan	moan
	moat	poach	roach	road
	roam	roan	shoal	soak
	soap	toad		
ii	boar	roar	soar	
4ai	boast	coast	roast	toast
ii	board	hoard		
4bi	bloat	cloak	croak	float
	groan	throat		
5bii	coarse	hoarse		
6ai	carload	charcoal	cloakroom	crossroad
	flatboat	lifeboat	oatmeal	railroad
	raincoat	roadside	rowboat	sailboat
	seacoast	stagecoach	steamboat	tugboat
	waistcoat(P)			
ii	billboard	blackboard	cardboard	seaboard
	sideboard	surfboard	uproar	
6bi	boating	coastal	coaster	loafer
	oaken	soapy	toaster	unload
ii	boarder	roaring		
7ci	afloat	approach	roadster	
ii	aboard			

16,4 Frequency = 61

AW10 Frequency = 44

1b awe awl

2a caw jaw law paw
raw saw thaw

2b bawl dawn fawn hawk
lawn shawl yawn

3b claw craw draw

4b crawl drawn spawn

5b sprawl squaw squawk straw

6a crawfish drawbridge jigsaw lockjaw
outlaw rawhide rickshaw sawdust
sawmill seesaw withdraw

6b drawing lawful

7a awful awkward awning

7c gawky lawyer

AU10 Frequency = 17

2b haul maul

4a fault gauze haunt launch
sauce vault

6a saucepan

7a auburn August author

7c applaud faucet laundry saucer
saucy

16.5 Frequency = 48

0I10 Frequency = 26

1b oil

2b boil coil coin foil
join loin soil toil

4a choice joint moist point
voice

4b broil spoil

5a spoilt

6a oilcloth

6b pointer oily

7a ointment

7c appoint avoid coinage doily
toilet

OY10 Frequency = 22

2a boy coy joy toy

6a bellboy boyhood cowboy soybean
tomboy toyland toyshop

6b boyish joyful

7a oyster

7b ahoy annoy destroy employ
enjoy

7c loyal royal voyage

16,6 Frequency = 57

UE10 Frequency = 20

2a	due	hue **	sue	
2b	duel	fuel **		
3b	blue *	clue *	flue *	glue *
	true *			
4b	cruel *			
6a	bluebell *	bluebird *	bluejay *	blueprint *
	skyblue *			
6b	cruelly *	untrue *		
7b	argue **	rescue **		

UI10 Frequency = 7

1	fruit *	juice	suit
2	fruitcake *	grapefruit *	lawsuit
3	pursuit		

EW10 Frequency = 30

2a	chew	dew	few **	mew **
	new	pew **	whew	
3b	blew *	brew *	crew *	drew *
	flew *	grew *	stew *	threw *
5b	screw *	strew *	strewn *	
6a	brandnew	dewdrop	newborn	New York
6b	newly	unscrew *		
7b	anew			
7c	jewel	pewter **	sewage	sewer
	steward			

---

* = always pronounced [u]
** = always pronounced [yu]
Unasterisked words may be pronounced either [u] or [yu], but [u] predominates.

Block 17 Frequency = 402

17,1 Frequency = 123

three-syllable compounds Frequency = 123

afternoon
alderman **
alongside
angleworm
applesauce
archbishop
backwoodsman#
baggageman *
barbershop
basketball
battleship
blackberry
blueberry
bluebonnet
bric-a-brac
bumblebee
buttercup
butterfly
buttermilk
butternut
butterscotch
buttonhole
candlestick
cannonball
checkerboard
coffeepot
commonwealth
cottonseed
cottontail
cottonwood
crackerjack
cubbyhole
dairyman **
fairyland
fellowman *
ferryman **
ferryboat
fingernail
fingerprint
firecracker
fisherman **
flowerpot
flyaway
forefinger
gentleman **
gingerale
gingerbread
goldenrod
Grand Canyon
grandchildren
granddaddy
grasshopper
gunpowder
headquarters#
hereafter
hobbyhorse
Hollywood
horsepower
hummingbird
jellybean
jellyfish
leadership
lollypop
lumberjack
lumberman **
lumberyard
membership
midsummer
mockingbird
motorboat
needlework
New Orleans #
northeastern
northwestern
orangeade
outerspace
partnership
peppermint
pineapple
pocketbook
pumpkinseed (P)
pussycat
quarterback
quicksilver

---

* -man [mæn]   ** -man [mən]   # s → [z]

17,1 (con't)

rattlesnake runaway salesmanship# silverware
skyrocket southeastern southwestern sportsmanship **
strawberry storybook summertime sunbonnet
sunflower tattletale teakettle tenderfoot
three-cornered thunderstorm tinderbox
ting-a-ling trustworthy underbrush underground
underline underneath underpass undershirt
underskirt understand understood undertake
undertook underwear uppercut wildflower
windowpane wintergreen wintertime wonderland

17,2 Frequency = 162

-er Frequency = 45

1 baker blazer choker diner
diver driver glider grader
hater liner maker miner
piper poker Quaker racer
rider rover ruler saver
scraper shaker shiner skater
tamer trader tuner voter

2 carver dancer freezer ledger
lover weaver

3 fiddler gobbler muffler peddler
rattler sampler settler sparkler
tumbler

4 drier flier

-en Frequency = 9

broken frozen ripen shaken
spoken stolen taken waken
woven

-ing Frequency = 16

1 aging biting boring daring
dining icing lining making
piling saving shaving siding
striking tubing

2 bluing carving

-y Frequency = 14

1 bony grimy icy scaly
scary shady shaky shiny
smoky stony wavy

2 fleecy horsy juicy

17,2 (con't) -s Frequency = 49

1a airs arms blinds blues
dues eaves goods greens
gums hers lens means
news ours shears suds
1b backwoods beeswax downstairs insides
newsboy newsman newsmen salesman
sideways statesman sweepstakes tenpins
upstairs upwards
1c gallows goggles manners oodles
pliers rompers rubbers tidings
tweezers
1d ourselves selves sheaves themselves
wives
2a blazes glasses riches
2b funnies studies

-ed Frequency = 29

1ai armed bagged barbed bobbed
chapped charred heeled mashed
skilled tanned webbed winged (P)
1aii checkered concerned hardboiled tattered
1b blessed (P) peaked (P)
2ai bored tired famed striped
2aii ashamed freckled refined unruled
2b dated faded
3 candied

17,3 Frequency = 117

-er Frequency = 48

1a commander container customer destroyer
employer follower forester gardener
kidnapper propeller retainer sharpener
sufferer trumpeter transformer

1b announcer condenser divider explorer
producer subscriber villager voyager

2a anteater bookkeeper bootlegger cowcatcher (P)
dogcatcher (P) frankfurter hairdresser hamburger
innkeeper kingfisher nutcracker penholder
roadrunner sheepherder stonecutter storekeeper
woodcutter woodpecker

2b caretaker dressmaker lifesaver outsider
sandpiper skyscraper teenager

-en Frequency = 3

awaken forgotten forsaken

-ing Frequency = 12

bookkeeping bottling (P) concerning dairying
furnishings happening oncoming outstanding
pertaining seafaring surroundings Thanksgiving

-ed Frequency = 6

assorted back-handed excited forested
left-handed redheaded

17,3 (con't) -ly Frequency = 48

1	aimlessly	bitterly	breathlessly	carelessly
	commonly	constantly	correctly	cowardly
	directly	eagerly	entirely	evenly
	extremely	foolishly	formerly	heavenly
	helplessly	immensely	instantly	intensely
	lovingly	normally	orderly	perfectly
	politely	quarterly	securely	severely
	sincerely	suddenly	westerly	willingly
2	angrily	cheerily	happily	heavily
	luckily	merrily	readily	steadily
3	awfully	carefully	cheerfully	faithfully
	gracefully	joyfully	peacefully	thankfully

Block 18 Frequency = 512

18,1 Frequency = 304

E13 Frequency = 121

1 rebel (Vb) recall recede recent
recess recite record (Vb) redeem
reduce refer refine reform
refuel regard rejoice relate
relay relent rely remain
remains remark remind remit
rename repaid repair repay
repeal repeat report request
require retail retire return
reveal revenge reverse revive
revolve reward

2 became become befall before
began begin begun behave
beheld behind behold belong
below beneath berate beside
beware bewitch beyond

3 debate decay decent decide
decoy deduct defeat defect
defend defense define delay
demand deny depart depend
deport detail detect device

4 elapse elect elope equal
era (P) erect even event
evil

18,1 (con't)

5 precede predict prefer prefix
prepaid prepare pretend prevail
prevent

6 cedar female fever frequent
legal meter pecan (P) scenic
serum tepee

7 beginner belonging beloved (P) equally
frequently recently reducer related
reminder reporter revolver revolving

18,1 (con't) 013 Frequency = 72

1 oboe odor omit opal
open oval over

2 proceed prolong protest

3 bonus colon cozy focus
holy hotel kodak local
locate locust mobile (P) Mohawk
molar moment motel motor
nomad notice polar Polish
pony robot Roman romance
rotate sober soda sofa
solar thorax token topaz
total totem vocal

4 clover crocus grocer pronoun
slogan storage

5 moreover motorcar motorman opener
opening orally overalls overboard
overcast overcoat overcome overflow
overhaul overhead overhear overjoyed
overland overlook oversleep overtake
overturn

18,1 (con't) A13 Frequency = 43

1 acorn agent baby bacon
caper crater crazy fatal
favor flavor gravy haven
hazel label labor laden
lady lazy major naked
native naval navy pagan
paper radar raven razor
saber taper vacant vapor
wafer

2 babytalk flavoring laborer ladybug
landlady lazily newspaper sabertooth
sandpaper wallpaper

I13 Frequency = 39

1 ideal iris Irish item
ivy

2 china (China) cider digest direct (P)
divan (P) fiber final finance
license lilac minor minus
minute (Aj) pilot pirate rival
silence silent siren tidy
tiger tiny viking vizor
wiry

3 bridal climate Friday private
spider spiral

4 chinaware finally silently

18,1 (con't) U13   Frequency = 29

1i	Cuba **	cubic **	duty	hula *
	human**(P)	humane **(P)	humor **(P)	July
	puny **	pupil **	ruby *	rumor *
	tulip	tunic	tutor	unit **
	unite **			
ii	during	jury	mural **	rural *
2i	brunette *	brutal *	plumage *	student
	stupid	truly *		
ii	plural *			
3	superman			

---

* = always pronounced [u]
** = always pronounced [yu]
Unasterised words may be pronounced either [u] or [yu], but [u] predominates.

18,2 Frequency = 151

S20 Frequency = 94

2a use (Vb)

2b cause cheese chose close (Vb)
fuse hose noise nose
pause pose raise rise
rose these those wise

3b bruise cruise praise prose
clause

6a crosswise likewise primrose rosebud
rosewood sunrise

6b chosen easy noisy noiseless
rosy unused unwise wisely

7b abuse (Vb) accuse advise amuse
applause arise arose because (P)
Chinese (P) compose comprise confuse
despise excuse expose oppose
refuse repose suppose surprise (P)

7c daisy desert (Vb) deserve desire
drowsy laser miser music
peasant poison pleasant present (Vb)
preserve preside presume raisin
reason resent reserve resist
resolve resort result rosette
season thousand thousandth treason
trousers weasel

18,2 (con't)

8a cheeseburger cheesecloth

8b amusing composer easily pleasantly
seasoning noiselessly

S21 Frequency = 56

1a blouse grouse house (N) louse
mouse

1b bathhouse birdhouse boathouse clubhouse
farmhouse greenhouse henhouse hothouse
houseboat household housekeeper housemaid
housetop housewife housework meetinghouse
mousetrap pesthouse playhouse powerhouse
roundhouse smokehouse storehouse warehouse

2a base case chase vase

2b basement bookcase erase eraser
pillowcase purchase showcase staircase
suitcase

3 cease crease decrease grease
greasy (P) increase lease release

4 caboose goose gooseberry loose
loosely moose noose

18,3 Frequency = 29

A22 Frequency = 29

1 Arab baron caret carol
caroler grandparent parent Paris
tariff vary

[illegible] arrow arrowhead barrel barren
carrier carrot carry carryall
garret harrow marrow marry
narrow parrot sparrow tarry
wheelbarrow

3 scarce scarcely

18,4 Frequency = 28

025 Frequency = 28

1 fro go ho lo
no so

2 hero hobo polo silo
solo yoyo zero

3 alto auto banjo bingo
bronco cargo fatso grotto
jello lasso lotto motto
stucco

4 ago hello

Block 19 Frequency = 287

19,1 Frequency = 81

-ment Frequency = 23

1 advancement agreement amendment amusement

announcement appointment attainment contentment

employment enjoyment engagement enrollment

equipment excitement government investment

settlement

2 apartment assortment compartment department

deportment embankment

-or Frequency = 14

1 conductor contractor director erector

governor inspector instructor inventor

professor projector

2 advisor dictator equator survivor

-ive Frequency = 14

1 attractive detective digestive effective

excessive inventive oppressive possessive

progressive

2 destructive exclusive expensive explosive

extensive

-ness Frequency = 12

1 carelessness eagerness foolishness gentleness

politeness selfishness

2 bushiness cleanliness happiness laziness

loveliness readiness

19,1 (con't) -ance/-ant Frequency = 18

1 acceptance admittance allowance appearance
assistance assistant attendance attendant
performance

2 alliance endurance ignorance ignorant

3 abundance abundant accordance importance
important

19,2 Frequency = 88

IE11 Freqenncy = 8

1 die fie lie pie
tie

2 magpie necktie untie

124 + GH10 Frequency = 60

2a high sigh thigh

2b fight light might night
right sight tight

4a tights

4b blight bright flight fright
plight slight

6a airtight daylight flashlight foresight
headlight highchair highjump highland
highway lighthouse midnight moonlight
nightgown nighttime right-hand skylight
streetlight sunlight upright

6b brighten brightly brightness fighter
frighten frightful highly lighter
lightly mighty relight rightly
slightly tighten tightly

7c delight lightning tonight twilight

8a overnight

8b delighted highlander right-handed sight-seeing

19,2 (con't) GH10 Frequency - 13

1 bough plough
2 caught naught straight taught
3 daughter granddaughter haughty naughty
slaughter slaughterhouse straighten

H20 Frequency = 7

1 herb hour
2 huh pooh ugh
3 graham shepherd

19,3 Frequency = 59

K20 Frequency = 26

1a knee knew know
1b knack knead kneel knell
knit knob knock knoll
knot
3a knave knelt knife knight
6a jacknife knapsack knighthood knothole
6b pocketknife topknot
6b knotty unknown
7a knickers knuckle

G20 Frequency = 9

1 gnat gnaw
2a assign assignment design resign
sign signboard
2b campaign

19,3 (con't) W20 Frequency = 24

1b	wrap	wrath	wreath	wreck
	wren	wretch	wring	wrong
3a	wrench	wrist	write	wrote
6a	shipwreck			
6b	rewrite	unwrap	wrapper	wrecker
	wringer	writer		
7a	wriggly	wrinkle	wristlet	written
8a	handwriting			

19,4 Frequency = 13

B20 Frequency = 13

2b	bomb	dumb	lamb	limb
	numb	thumb		
3b	crumb	plumb		
6a	dumbbell	lambskin	thumbtack	
6b	bomber	plumber		

19,5 Frequency = 40

L20 Frequency = 21

1a balk chalk stalk talk
walk

1b beanstalk chalkboard cornstalk sidewalk
talker walker

2 folk kinsfolk yolk

3 behalf calf half halfway

4 calves salve

5 salmon

T20 Frequency = 19

1 bristle bustle castle gristle
hustle jostle nestle rustle
thistle trestle whistle wrestle

2 fasten glisten listen listener (P)
moisten

3 often soften

19,6 Frequency = 6

U20 Frequency = 6

1 guard guess guest guide

2 guilty safeguard

Block 20 Frequency = 119

20,1 Frequency = 48

-y Frequency = 12

1 archery armory cannery creamery

Germany pottery unity

2 injury sunshiny

3 agency loyalty rivalry

-ful Frequency = 8

colorful forgetful plentiful (y [i] → i [ɪ])

powerful sorrowful teacupful teaspoonful

wonderful

-al Frequency = 7

1 orbital personal renewal musical

2 arrival festival recital

-able Frequency = 6

1 passable peaceable seeable suitable

2 likable lovable

-eth Frequency = 5

fiftieth fortieth sixtieth thirtieth

twentieth

-less Frequency = 4

colorless odorless penniless (y [i] → i [ɪ])

regardless

-ist Frequency = 4

loyalist motorist organist soloist

-ish Frequency = 2

kittenish yellowish

20,2 Frequency = 39

PH10 Frequency = 19

3a	phase	phone		
3b	graph			
4c	phrase			
5c	sphere	sphinx		
7a	phantom	pheasant	phony	photo
7c	asphalt	camphor	graphic	nephew
	orphan	pamphlet	phosphate	prophet
	sulphur			

CH31 Frequency = 20

3a	chord			
4c	chrome			
5a	school			
5c	scheme			
6a	schoolbag	schoolbook	schoolboy	schoolhouse
	schoolmate	schoolroom	schooltime	
6b	schooling			
7a	chorus	christen		
7b	stomach			
7c	echo	orchid	schooner	
8a	schoolmaster	schoolteacher		

20,3 Frequency = 26

TH12 Frequency = 26

1a bother brother farther feather
further gather leather mother
other rather smother weather
whether whither wither

1b brotherly gatherer godmother grandmother
leathery otherwise pinfeather stepmother
weatherman

2 northern

3 breathe

20,4 Frequency = 6

CC11 Frequency = 6

1 accent accept succeed success

2 acceptance successful

Block 21 Frequency = 177

21,1 Frequency = 37

un- Frequency = 19

unbroken unbuckle unbutton unconcerned
uncover uneasy uneven unhappy
unharness unhealthy uninjured unlawful
unlucky unpleasant unruly unselfish
untangled untidy unwelcome

re- Frequency = 6

readmit reconstruct recover re-elect
remember reopen

dis- Frequency = 5

disagree disappear disappoint discover
disorder

in- Frequency = 4

incorrect informal inhuman injustice

mis- Frequency = 3

misbehave misconduct mispronounce

21,2 Frequency = 81

-tion Frequency = 81

1 action auction caution diction
faction fiction fraction friction
mention motion nation notion
portion potion section station
traction

2a adoption attraction collection connection
construction contraction correction direction
distinction election eruption exception
extraction infection inspection instruction
invention objection prevention protection
selection subtraction

2b affection carnation commotion confection
proportion salvation solution

3 devotion dictation donation location
oration promotion relation rotation
translation vacation

4a formation foundation plantation taxation
temptation

4b quotation starvation

5 attention conjunction convention description
destruction detention inscription intention
junction production reception reduction
subscription

6 fractional sectional

7 question digestion suggestion

21,3 Frequency = 32

-sion → [šən] Frequency = 20

1a	mission	session		
1bi	confession	discussion	expression	impression
	possession	profession		
1bii	admission	commission	permission	
1biii	percussion	procession	succession	
2a	mansion	pension	tension	
2b	convulsion	dimension	expansion	

-sion → [žən] Frequency = 12

1	abrasion	occasion		
2	diversion	excursion		
3a	conclusion	erosion	explosion	seclusion
3b	collison	decision	division	provision

21,4 Frequency = 27

-ture Frequency = 27

1	capture	creature	culture	feature
	fixture	fracture	future	lecture
	mixture	moisture	nature	pasture
	picture	posture	puncture	rapture
	rupture	sculpture	structure	torture
	venture	vulture		
2	adventure	furniture	overture	seacreature
	signature			

Block 22 Frequency = 324

22,1 Frequency = 92

Stress pattern 3B Frequency = 92

1a absolute advertise aggravate altitude
antelope antiquate appetite atmosphere
attitude calculate candidate centipede
concentrate cultivate envelope (N) estimate (Vb)
fascinate illustrate indicate institute
irrigate multitude sensitize substitute
vaccinate ventilate vestibule

1b alternate(Vb) artichoke circulate fertilize
fumigate harmonize hibernate hurricane
longitude marmalade merchandise(P) organize
persecute porcupine turpentine vaporize

2 certify crucify dignified fortify
justify lullaby magnify multiply
mummify notify occupy purify
terrify testify

3 alphabet architect autograph Bethlehem
caravan consequence daffodil difficult
frankinsense paragraph parallel penmanship
photograph subtrahend thermostat

4 anteroom astronaut barbecue buffalo
bungalow celluloid chickadee corduroy
dinosaur indigo marigold mistletoe
nowadays parakeet peekaboo piccolo
somersault uniform universe yesterday

22,2 Frequency = 124

Stress pattern 3A Frequency = 124

1 allergy ancestry artery battery
balcony century charity company
contrary cranberry currency dignity
gallery industry mercury mulberry
pharmacy primary prophecy possibly
purity rickety rotary summary
tendency terribly

2 article barnacle capable constable
follicle horrible icicle multiple
notable particle pinnacle possible
rectangle sensible spectacle terrible
vehicle

3 admiral cannibal carnival funeral
hospital interval numeral principal
sentinel terminal vertical

4 ancestor carpenter character circular
corridor cucumber emperor juniper
mariner messenger milliner officer
passenger singular

5 algebra Florida formula gondola
orchestra taffeta

6 abdomen(P-AS) badminton (P) bulletin cardigan
cinnamon coconut emphasis garrison
invalid(P-AS) mannikin moccasin octopus
paraffin Puritan stewardess vitamin
wilderness

22,2 (con't)

7

accident afterward afterwards applicant
consonant continent excellent immigrant
implement impudent incident innocent
instrument ornament pharmacist permanent
sentiment supplement testament

8

accurate adjective alternate(Aj) ambulance
armistice confidence countenance estimate (N)
juvenile (P) opposite ordinance orphanage
talkative transitive

22,3 Frequency = 89

Stress pattern 3C Frequency = 89

1 Alaska alfalfa angora antenna
bandanna bermudas chinchilla crayola
diploma gorilla saliva vanilla
veranda victrola umbrella

2 another December disaster divisor
embroider encounter endeavor November
October remainder semester September
suspenders together

3 Chicago contralto flamingo kimomo
memento pimento potato tobacco
tomato tornado torpedo volcano

4 abandon accustomed appendix asbestos
bronchitis domestic elastic electric
embarrass fantastic galoshes gigantic
historic horizon indignant interpret
majestic molasses narcissus oppossum
opponent persimmon romantic toboggan
transparent

5 apostle apparel assemble eternal
illegal immortal orchestral utensil

6 adhesive advantage assembly canary
committee dependence determine employee
infertile intestine percentage productive
remembrance resemblance tomorrow

22,4 Frequency = 19

Stress pattern 3D Frequency = 19

1 absentee buccaneer chimpanzee engineer
halloween(P) velveteen

2 bayonet (AS) clarinet contradict correspond
entertain impolite intercede interfere
interrupt introduce kangaroo mandolin
mayonnaise (AS)

Fourth-Year Word List

Frequency = 1129

Block 23 Frequency = 151

23,1 Frequency = 72

A29 Frequency = 29

1a baste haste paste taste
waste

1b distaste hasten hastily hasty
pasteboard paster pastry tasteless
tasty wastebasket

2 arrange arrangement change changeable
exchange mange mangy range
ranger strange stranger

3 angel danger endanger

A24 Frequency = 43

1 wad wan wand want
wash wasp watch

2 swamp swan swat

3 flyswatter swampy swatter unwashed
washer Washington washtub watchdog
watchmaker watchman whitewash

4 swallow waffle wallet wallop
walnut walrus wampum wander
wanderer water waterer waterfall
waterway watery wigwam

5 quality quantity squab squad
squander squash squat

23,2 Frequency = 48

135 Frequency = 21

1a mi ski ti

1b confetti Hopi

2 chlorine marine quarentine ravine
sardine submarine tangerine vaccine

3 casino farina mobile(P) petticoat
pinochle police policeman polliwog

125 Frequency = 27

1 billion communion million millionaire
onion pavillion rebellion reunion
stallion union

2 behavior junior savior senior

3 ammonia begonia magnolia petunia

4 interview review view viewer

5 brillaint convenience convenient genial(P)
peculiar

23,3 Frequency = 31

Y11 Frequency = 8

linotype lyre paralyze style
teletype type typewrite typewriter

Y13 Frequency = 6

asylum dynamite papyrus stylish
typist tyrant

Y15 Frequency = 7

antonym Brooklyn Egypt gym
lynch lynx myth

Y16 Frequency = 10

crystal gymnastics gypsy hypnotize
pygmy syllable symbol sympathy
symphony system

Block 24 Frequency = 223

24,1 Frequency = 50

Four-syllable compounds Frequency = 11

brother-in-law dictatorship forget-me-not huckleberry
jack-o-lantern merry-go-round morning-glory relationship
San Francisco sister-in-law United States

-ing Frequency = 7

appetizing embarrassing magnifying merrymaking
self-governing understanding undertaking

-y Frequency = 1

difficulty

-er Frequency = 6

discoverer fertilizer multiplier overseer
photographer undertaker

-or Frequency = 8

captivator cultivator incubator insulator
numerator percolator supervisor ventilator

-en Frequency = 1

undertaken

-ed Frequency = 2

complicated disappointed

-ly Frequency = 14

1 apparently contentedly disorderly exceedingly
excitedly extensively intimately personally
practically(P) respectively unwillingly
2 respectfully successfully wonderfully

24,2 Frequency = 89

E38 Frequency = 38

1a exit exile Texas

1b exercise execute flexible Mexican
Mexico

2a clever crevice devil ever
levee lever level levy
never seven seventh sever

2b devastate eleven eleventh evergreen
evermore evidence evident forever
however revenue seventeen seventeenth
seventy whenever whichever

2c everlasting evidently Beverly Hills

I38 Frequency = 22

2a civic civics civil forgive
give giver live(Vb) liver
quiver river rivet shiver
sliver shortlived shrivel vivid

2b civilize cod-liver deliver forgiveness
liverwurst privilege

24,2 (con't) A38 Frequency = 21

1a axis axle taxi

1b saxophone taxicab

2a cavern gravel have ravel
savage travail(P) tavern travel
travels

2b avalanche avenue cavity davenport
lavender navigate scavenger

038 Frequency = 8

1a foxy oxen

2a novel proverb province

2b poverty providence novelty

24,3 Frequency = 67

A28 Frequency = 19

1a magic magical panic

1b chromatic dramatic dramatics mechanic volcanic

2a habit inhabit

3 banish radish Spanish vanish

4 acid invalid (meaning "not valid") rapid rapidly rapids

I28 Frequency = 17

1a clinic mimic

1b artistic pacific terrific

2a limit spirit spirited visit visitor

2b prohibit solicit

3 diminish finish unfinished

4 frigid timid

Y28 Frequency = 2

1a physic physics

24,3 (con't) 028	Frequency = 20				
	1a	chronic	comical	frolic	phonic
		phonics	tonic	topic	tropic
		tropical			
	1b	alcoholic	atomic	masonic	
	2a	profit	profiteer	vomit	
	2b	deposit			
	3	abolish	astonish	polish	
	4	solid			
E28	Frequency = 9				
	1a	relic			
	1b	athletic	athletics	pathetic	
	2a	credit			
	2b	editor	inherit		
	3	cherish	perish		

24,4 Frequency = 17

General primary vowel Rule 27 Frequency = 17

1	humanity	humidity	morality	prosperity
	rapidity	vitality		
2	activity	captivity	hostility	nobility
3	ability	capacity	facility	posterity
	simplicity	stability	vicinity	

Block 25 Frequency = 240

25,i Frequency = 61

-tion Frequency = 61

1a interjection intersection reconstruction

1b arbitration circulation compensation constipation
constitution contribution corporation cultivation
distribution fascination illustration institution
irrigation navigation numeration vaccination
ventilation

2a annexation cancellation confirmation information
transportation

2b admiration combination conservation consolation
conversation exploration inspiration invitation
observation perspiration respiration

3 composition disposition exposition opposition

4 application exclamation explanation inflammation
introduction occupation

5 definition preparation preposition preservation
recitation reputation reservation resolution
revelation revolution

6 ammunition aviation constellation jubilation
jurisdiction

25,2 Frequency = 63

I26 Frequency = 30

1a dial diet giant liar
lion riot

1b briar friar quiet science
trial triumph

2a quietly quietness sealion sundial
triumphant

2b diagram diary iodine liable
pioneer scientist triangle viaduct
violate violence violent violet
violin

Y26 Frequency = 2

cyanide hyena

U26 Frequency = 11

1 bluish bruin duet fluid
ruin suet truant

2 annual annually(P) influence suicide

E26 Frequency = 15

1 create meow

2 area cereal creation idea
leotard meteor museum peony
preamble prearrange reaction rodeo(AS,P)
theater

25,2 (con't)

026 Frequency = 3

poem poet poetry

A26 Frequency = 2

gaity mosaic

25,3 Frequency = 37

136 Frequency = 35

1 fiord

2 curio folio polio portfolio
radio studio

3 calcium helium medium premium
radium stadium

4 alien audience barrier champion
chariot foliage Indian lariat
maniac oriole period radiant
radius ruffian serial terrier
viola warrior zinnia zodiac

5 championship hurriedly

Y36 Frequency = 2

embryo Tokyo

25,4 Frequency = 33

A12 Frequency = 18

1 able cable cradle fable

gable ladle maple sable

stable staple table

2 enable tablecloth tablespoon tablespoonful

tableware timetable unable

I12 Frequency = 9

Bible bridle entitled idle

idleness idly rifle title

trifle

Y12 Frequency = 2

cycle motorcycle

O12 Frequency = 2

noble nobleman

U12 Frequency = 2

bugle bugler

25,5 Frequency = 46

E14 Frequency = 20

1 reflect reflection refrain refresh
refreshment regret replace reply
retract retreat

2 cathedral declare decline decrease
deprive eclipse Negro secret
secretly zebra

I14 Frequency = 9

biplane library microphone microscope
migrate migration nitrate tigress
vibrate

Y14 Frequency = 4

cyclone cypress hydrant hydrogen

A14 Frequency = 6

April apron fragrance patriotic
patronize(P) sacred

O14 Frequency = 4

okra only proclaim program

U14 Frequency = 3

duplicate(P) lubricate nutrition

Block 26 Frequency = 311

26,1 Frequency = 37

-able Frequency = 19

1 accountable agreeable available comfortable(P)
dependable enjoyable favorable obtainable
profitable reasonable remarkable respectable

2 noticeable serviceable

3 adorable desirable excusable valuable(P)

4 reliable

-ment Frequency = 5

advertisement astonishment disappointment embarrassment
entertainment

-al Frequency = 8

1 continental departmental electrical historical
oriental

2 congressional emotional professional

-ness Frequency = 2

effectiveness unselfishness

-ary Frequency = 2

dictionary missionary

-ist Frequency = 1

violinist

26,2 Frequency = 35

IE17 Frequency = 12

1 birdie brownie cookie kiddie
laddie lassie

2 caddie collie hippie kewpie
mashie prairie

EY17 Frequency = 23

1 mousey pulley

2 alley barley chimney donkey
galley hockey honey jockey
money monkey parley parsley
trolley turkey valley volley

3 honeybee honeydew honeymoon honeysuckle
volleyball

26,3 Frequency = 10

AI17 Frequency = 10

bargain captain certain certainly
curtain fountain mountain mountainside
uncertain villain

26,4 Frequency = 18

EA33 Frequency = 18

1b earn earth

2b heard learn pearl search

yearn

4a hearse

6a earthquake earthworm searchlight

6b pearly

7a early earnest earthling

7c rehearse

8b earnestly rehearsal

26,5 Frequency = 54

IE12 Frequency = 39

2b chief pier thief

4a field fiend niece piece

shield siege yield

4b brief grief shriek

5a grieve priest

5b fierce pierce

6a briefcase cornfield crosspiece

6b chiefly fielder fiercely

7c achieve apiece belief believe

cashier chieftain frontier hygiene

relief relieve wiener

8a battlefield makebelieve

8b disbelieve left-fielder out-fielder

26,5 (con't) EI10 Frequency = 15

2b sheik

4a weird seize

7a either(P)

7c caffeine ceiling conceit deceit
deceive neither(P) perceive protein(P)
receive

8b receiver deceitful

26,6 Frequency = 28

EY10 Frequency = 9

2a hey they whey

3b grey prey

6a greyhound

7b obey

8b surveyor disobey

EI20 Frequency = 19

1 neigh sleigh weigh

2 eight freight weight

3 reign reins vein

4 bobsleigh eighteen eighteenth eighth
eighty neighbor neighborhood neighboring
overweight reindeer

26,7 Frequency = 121

-ous Frequency = 38

1 dangerous humorous joyous marvelous
mountainous poisonous prosperous

2 adventurous famous grievous nervous
porous

3 furious industrious injurious mysterious
studious various victorious

4 monstrous wondrous

5 courteous curious enormous jealous
numerous obvious previous rebellious ,
serious tedious treacherous tremendous

6 furiously jealousy joyously previously
seriously

OU31 Frequency = 26

2b touch young

6a touchdown

6b touched touching

7c country couple courage cousin
double doublet flourish journal
journey nourish southern trouble
youngster

8a double-cross crosscountry troublesome

8b discourage

9c courier encourage tambourine

10b discouragement

26,7 (con't) 0U35 Frequency = 27

2bi	dough	soul	though	
ii	four	pour		
4ai	mould			
4aii	court	fourth	gourd	mourn
5bii	course	source		
6ai	doughnut			
6aii	courthouse	courtyard	fourscore	fourteen
	mournful			
7bi	borough	thorough		
7ci	boulder	moulding	poultry	shoulder
8bi	thoroughly			
9ci	cantaloupe	thoroughbred		

0U33 Frequency = 19

2ai	you		
2bi	soup		
2bii	tour	your	
4ai	route(P)	wound(N,V)	youth
4aii	yours		
4bi	group	through	
5ai	troupe		
6ai	throughout		
6aii	yourself		
7ci	cougar	coupon	
7cii	detour	tourist	
9bi	caribou		
9ci	souvenir		

26,7 (con't) OU34 Frequency = 11

1b ought

2b bought fought nought sought thought

4b brought

6a forethought

6b thoughtful thoughtless

8b thoughtfulness

26,8 Frequency = 8

U131 Frequency = 8

4a build built

6b builder rebuild rebuilt building

7c biscuit circuit

Block 27 Frequency = 204

27,1 Frequency = 19

un- Frequency = 8

1 uncivilized unconnected unexpected unlimited

2 uneventful unimportant unmerciful unsuccessful

in- Frequency = 6

inattention inattentive inconvenient independence

independent indigestion

dis- Frequency = 3

disappearance disinfectant disqualify

mis- Frequency = 2

misunderstand misunderstood

27,2 Frequency = 69

Stress pattern 4A Frequency = 59

1a Arabia bacteria diphtheria(P) malaria

1b adverbial centennial colonial congenial
imperial industrial material memorial
perennial

1c appropriate(Aj) immediate librarian

2 aquarium geranium gymnasium linoleum
petroleum

3a exterior inferior interior superior

3b ambassador proprietor rectangular triangular

3c artillery dispensary distillery

4 emergency necessity society transparency
variety

5 coincidence equivalent experience intelligence
intelligent obedience obedient

6 impossible inflammable invincible responsible

7 aluminum arithmetic asparagus declarative
diversify extravagant identical intransitive
Jerusalem peninsula receptacle

Stress pattern 4B Frequency = 10

1 abbreviate assassinate communicate inaugurate
incorporate interrogate intoxicate investigate

2 identify insecticide

27,3 Frequency = 23

Stress pattern 4C Frequency = 23

1 automatic economics(P) pancreatic prehistoric
scientific supersonic sympathetic systematic
2 antitoxin Arizona carbohydrate correspondence
fundamental horizontal incandescent influenza
interference interurban laryngitis locomotive
Mississippi multicolored tonsilitis

27,4 Frequency = 14

Stress pattern 4D Frequency = 14

1 customary ordinary stationary temporary
2 alligator architecture aviator cauliflower
dandelion dormitory kindergarten millimeter
territory testimony

27,5 Frequency = 7

Other four-syllable words Frequency = 7

accuracy automobile charitable navigable
meteorite marionette multiplicand

27,6 Frequency = 72

E32 Frequency = 49

1a bakery bravery every grocery(P)
livery mystery nursery robbery
scenery shrubbery silvery slavery
slippery

1b conference difference different reverence
reverent

1c evening fattening offering

1d average bachelor beverage desperate
interest jeweler jewelry opera
pickerel porcelain several temperate
traveler vaudeville

2 desparately everyday everything groceryman(P)
indifferent interesting

3 circumference deliberate(Aj) delivery discovery
embroidery perfumery recovery refinery

032 Frequency = 13

1a factory hickory history ivory
victory

1b Catholic corporal favorite sophomore

2 comfortably(P) elaborate(Aj)

3 laboratory satisfactory

27,6 (con't) A32 Frequency = 7

1 boundary diamond diaper separate(Aj)

2 elementary frantically Niagara Falls

132 Frequency = 3

1 aspirin cardinal

2 parliament

Section III

Sequenced Irregularly-Spelled Words

Irregularly-spelled words are those words in which there is at least one case of a spelling-to-sound correspondence not included in the present set of correspondences. This section contains a sequenced listing of these words.

The sequence of irregularly-spelled words follows the rule sequence of Section II (summarized in Appendix C) and indicates the first point at which introduction of these words is recommended. (Rules for which there are no corresponding irregularly-spelled words are not listed.) For the most part the words in this section are sequenced with the correspondence rules to which they are exceptions or to which they are similar. In no case, however, are irregularly-spelled words introduced until all their component regular correspondences have been introduced.[7] (See Volume I, Section II, for further comments on the sequencing of irregularly-spelled words.)

In this section, words are grouped within each rule according to their irregular correspondence or, in a few cases, by category (e.g., numbers). The irregular correspondences are indicated by the standard notation (Berdiansky *et al.*, 1969), i.e., spelling to the left of the arrow, pronunciation to the right, environment noted where needed; e.g., o → [u]. The irregular grapheme units are underlined; e.g., do, to.

---

[7] In the development of a reading program it may be necessary to introduce some irregularly-spelled words at an earlier point, to allow naturalness and interest in written material. See Cronnell (1969b) for discussion of the introduction of irregularly-spelled words in beginning reading instruction.

Recommended Order of Instruction for Irregularly-Spelled Words in First Year

Frequency = 33

Block 1

1,1

A15 a → [ə]: a

I15 i → [ay]: I

1,3

S10 s → [z]: as is

1,5

B10 a → [e]: bass (in music)

1,6

H10 i → [ay]: hi

s → [z]: has his

O15 o → [o]: O

o → [u]: do to

Block 2

2,1

TH13 e → [ə]: the

Block 3

3,1

EE10 ee → [ɪ], [ɛ]: been

3,2

Y19 ye → [ay] / __#: bye dye lye rye

eye → [ay]: eye

Block 4

4,1

F10 a → [a]: aha fa ha

haha la ma

mamma(P) papa(P)

(in mamma and papa, one of the a's may be pronouned [ə], Rule A17)

aa → [a]: baa

musical terms:

irregular:
e → [e]: re
o → [o]/__l: sol
a → [a]: fa la

regular by TY and FoY rules:

do mi ti

W10 a → [ə], s → [z]: was

a → [æ] /w__: swam

i → [i] /__nd#: wind (N)

o → [ʊ]: wolf

Recommended Order of Instruction for Irregularly-Spelled Words in Second Year

Frequency = 110

Block 5

5,1

Compounds

i → i /__nd#: windmill

o → [u]: into onto

Block 6

6,1

A11 are → [ar]: are

I11 cardinal numbers:

irregular: one [wən]
two [tu]

regular by FY rules: four seven eight

(regular by present rules: three five six
nine ten)

6,2

E11 e → [e]: crepe

ere → [ər]: were

Block 7

7,1

C11 o → [wə]: once

Block 8

8,2

A16 a → [a]: grandma(P) grandpa(P)
(also n → [m], d → ∅, a → [ə])

Block 9

9,2

E21 th → [θ] /__er: ether panther

I21 t → [ti]: T-shirt

Block 10

10,1

E17 o → [o]: swollen

o → [ɪ]: women

A17 o → [ʊ]: woman

e → [e]: mesa

O17 ordinal numbers:

irregular: e → [ɛ] /__CV: second
i → [ay]: ninth

regular by FY rules: fourth seventh eighth

(regular by present rules: first third

fifth sixth tenth)

10,2

Y17 i → [ɪ] /__nd: windy

a → [ɛ]: any

th → [ð]: worthy

u → [ɛ]: bury

e → [ɪ]: pretty

LE22 c → [s] /__C: muscle

10,4

U11 s → [š]: insure sure surely

A25 toward → [tord]

10,5

A17 a → [ɑ]: garage (P) (also g → [ž])

U17 o → [u]: undo unto

Block 11

11,1

NG10 ng → [ŋ]: gingham (also h → Ø) length
lengthen strength strengthen
e → [ɪ]: England(P) English(P)

11,2

CH10 a → [ɑ], ch → Ø: yacht

11,3

WH10 wh → [h]: whole wholesale
also o → [u]: who whom
ere → [ɛr]: ere there therefore
where
a → [ɔ]: what

11,5

GG10 gg → [gǰ] (Rules G12, G11): suggest

Block 12

12,1

AY10 wednes → [wɛnz]: Wednesday
x → [ɛks]: X-ray
aye → [e], [ay]: aye(P)

12,2 ea → [e]: break breaker great
greatly steak
ea → [a] /__r: heart hearty

12,3

0011 u → [u]: cuckoo

0012 oo → [ə]: blood blooded bloody

flood

oo → [o] / __r: door doorstep doorway

floor indoor

ye → [ay] / __#: goodbye

Block 13

13,1

031 o → [u] / __v: improve move

prove

f → [v]: of

wh → [h]: wholesome

one → [wən]: someone

a → [ə]: somewhat

ere → [ɛr]: somewhere

U31 s → [š]: sugar

13,2

A23 a → [æ] / __ll#: shall

z → [s]: waltz

023 o → [ɔ], [a]: begone golf gone

13,3

024 o → [o] / __st: almost (also all → al [ɔl])

host most mostly

post postal poster

postman

13,3 (con't)

o → [o] /__l: control holster patrol

o → [o] /__ss: gross

o → [o] /__th: both

Block 14

s → [z]: cleanse cleanser clumsy
cosmos husband muslin
pansy plasma Thursday
wisdom

a → [ɔ] /__l: false

Recommended Order of Instruction for Irregularly-Spelled Words in Third Year

Frequency = 615

Block 15

15,2

eye → [ay]: eyeball eyebrow eyelash eyelid pinkeye

ea → [e]: breakdown daybreak greatness yea

ea → [a] /__r: hearth

o → [o] /__st: hostess lamppost postage postcard postpone postscript topmost utmost

o → [u] /__v: approve movement

oo → [ɔ]: doorbell doorman

oo → [ə]: bloodshed

s → [z]: absorb dismal observe

n → [n] /__ $\left\{\begin{matrix}[g]\\ [k]\end{matrix}\right\}$: engage incline include inquire

ng → [ŋ] /__...: lengthwise

V → [V̆] /__Ce#: allege comrade vineyard

e → [e]: fete

ere → [ɛr]: elsewhere

i → [ɪ] /__nd: windpipe

i → [ay]: pint

a → [ɔ] /__l: falsehood

ge → g [ǰ]: judgment

rh → [r]: rhinestone

whole + ly → wholly (wh → [h]; o → [o])

one → [wən]: oneself

catsup → [kɛ́čəp]

queue → [kyu]

Block 16

16,1

AI10 ai → [ɛ]: again against said

ai → [æ]: plaid

ai → [ay]: kaiak

16,2

OU10 oo → [o]: outdoor

oo → [ə]: bloodhound

16,3

OE10 oe → [u]: canoe horseshoe shoe shoehorn

shoelace shoestring snowshoe

OA10 oa → [ɔ]: abroad broad broadcast

broadcloth broadway

16,4

AW10 er → [r]: drawer

AU10 au → [æ]: aunt(P) aunty(P)

s → [z]: Santa Claus

16,6

UE10 ue → u [u]: truth truthful

ue → 0; ng → [ŋ]: tongue

s → [z]: Tuesday

EW10 ew → [o]: sew sewer

eu → [(y)u]: Europe grandeur neutral

Block 17

17,1

a → [ɛ]: anyhow anymore anyone anything

anytime anyway anywhere (also ere → [ɛr])

o → [ʊ]: saleswoman womanhood

o → [o] /__st: postmaster postmistress

o → [o] /__l#: patrolman self-control

ye → [ay]: rock-a-bye

oo → [ə]: bloodthirsty

all → al [ɔl]: already

e → [ɪ]: Englishman

17,2

eye → [ay]: blue-eyed cross-eyed eyeglasses

ye → [ay]: dyewoods

oo → [o]: outdoors out-of-doors (also f → [v])

all → al [ɔl]: always

irregular third person singular forms: does, goes

o → [u]: doings

o → [ʊ]: wolves

ee → [ɪ]: breeches

s → [z]: measles

towards → [tordz]

17,3

-er oe → [u]: shoemaker

-ed ea → [a] /__r: downhearted kindhearted

-ly ue → u [u]: truthfully

Block 18

18,1

E13 e → [ɛ]/__CV:

decade deluge herald heron
legend lemon lemonade medal
melon menace metal pedal
peril petal preface rebel (N)
record (N) refuge second secondhand
senate sheriff tenant

e → [i] /__ch V: recharge

n → [ny]: señor (P) (also e → [e]: señor)

o → [u]: remove

013 o → [a] /__CV

anybody (also a → [ɛ]) bodily body
comet copy model modest
nobody olive process project (N)
proper properly robin somebody
volume

oe → [u]: overshoe

A13 a → [æ] /__CV :

agate atom baboon (P) balance
cabin cafe (also e → [e]/__#) camel
chapel damage dragon fragile
famine granite Latin madam
malice manage manager palace

18,1 (con't) panel patent planet salad
satin Saturn shadow snapdragon
strata taboo talent talented
trapeze (P) wagon wagonload
vacuum (also uu → [yu]) valor value
a → [a]: amen drama lava llama
plaza

I13 i → [ɪ] /_CV:
city figure image linen
liquid lizard minute (N) minuteman
primer pity sinew spigot
spinach tribute vigor widow
wizard
iron → [áyərn]: iron flatiron

U13 u → [ə] /_CV: suburb study
rh → [r]: rhubarb

18,2

S20 s → [s] /V_V:
abuse (N) aside basis bison
close (Aj) closely crusade crusader
dose excuse (N) geese mason
nuisance promise (also o → [a] /_CV) purpose
sausage usage use (N) useful
useless vise
also: oi → [ə]: porpoise tortoise

18,2 V → [V̆] / __CV

chisel closet desert (N) prison

prisoner presence present (N) presently

risen rosin visit

o → [u]: lose whose (also wh → [h])

o → [ʊ]: bosom (P)

u → [ɪ]: business (also i → Ø) busily busy

n → [n] / __[k]: enclose inclose

ss → [z]: dessert dissolve possess scissors

S21 s → [z] /ea__e: disease displease ease

please tease

s → [z] / ou__e: arouse house (Vb) rouse

s → [z] /oo__e: choose

a → [æ] / __CV: papoose

18,3

A22 y + age → iage [ɪǰ]: carriage marriage

18,4

025 all → al [ɔl]: also

ere → [ɛr]: nowhere

u → [(y)u] / __#:

flu menu (also e → [ɛ] / __CV)

Block 19

19,1

-ment a → [æ] /__CV: management

ue → u [yu]: argument

-ive s → [s] /V__V: abusive

-ness ue → u [u]: truthfulness

19,2

124 + GH10

all → al [ɔl]: alright

eye → [ay]: eyesight

o → [a] /__CV: copyright

GH10

gh → [g] /#__: ghost ghostly

gh → [f]; au → [æ]: draught laugh laughingly laughter

H20 ah → [a] /__#: ah bah hurrah rah rajah (also a → [a]) yah

eh → [e], [ɛ]: eh

o → [a] /__CV: homage honest honestly honor

19,3

K20 oo → [o]: doorknob

ow → [a]: knowledge

19,3 (con't) G20 i → [ə] /__gn#: ensign
o → [o]: cologne
W20 w → Ø: answer sword

19,4

B20 b → Ø /__t#: debt doubt doubtful doubtless
i → [ay]: climb
o → [o]: comb
o → [u]: tomb

19,5

L20 ould → [ʊd]: could should would
a → [a] /__lm: almond calm palm
l → Ø: Lincoln solder
colonel → [kə́rnəl]
T20 t → Ø. chestnut mortgage
ot → [o]: depot
et → [e]: ballet buffet valet (also a → [æ] /__CV)

19,6

U20 i → [ɪ] /__CV: guinea guitar
u → Ø: disguise
u → [w] /...g__: jaguar (also a → [æ] /__CV) language penguin
u → [w]: persuade
uy → [ay]: buy buyer guy
ue → Ø /g__#: league plague rogue

19,6 (con't) que → [k] / __#: mosque

qu → [k]: conquer croquet (also et → [e] / __#)

turquoise

also V → [V̆] / __CV: laquer liquor

Other silent letters

d: d → Ø /#a__j: adjoin adjust adjustment

d → Ø: handsome

n: n → Ø/m__#: autumn

also o → [a] / __CV: column solemn solemnly

p: p → Ø / __b; oa → [ə]: clapboard cupboard

p → Ø /#__C(C ≠ r, l); a → [a] / __lm: psalm

corps → [kor]

Block 20

20,1

-y V → [V̆] / __CV: honesty sinewy

s → [š]: sugary

-ful i → [ɪ] / __CV: pitiful

-al o → [u]/ __v: approval removal

u → [ɛ]: burial (y → i [i])

-able o → [u] / __v: movable (optional e̸)

20,2

PH10 V → [V̄] / __phV: cipher gopher siphon

* trophy

pph → [f]: sapphire

20,2 (con't) CH31

ache → [ek]: ache backache earache

toothache stomachache

V → [V̆] /__CV: chemist monarch monarchy

scholar

n → [ŋ] /__ch: anchor

i → [ay]: Christ

t → Ø: Christmas

choir → [kwayr]

ch → [š]: chamois (also a → [æ] /__CV; ois → [i])

chauffeur (also au → [o]; eu [ə]) chef

chute mustache

also et → [e]: chalet (also a → [æ] /__CV)

crochet (also o → [o] /__chV) sachet

20,3

TH12

V → [V̄] /__the#: bathe clothe

a → [a]: father forefather grandfather stepfather

th → [ð]: clothing (also o → [o] /__thV) fathom heathen

smooth smoothly swarthy

clothes → [kloz]: clothes clothesbasket clothesline

clothespin underclothes

th → Ø: isthmus

Block 21

21,1

dis- o → [a] / __CV: dishonest dishonor

re- o → [a] / __CV: remodel

21,2

-tion i → [ɪ] / __tion: addition condition edition

partition position

a → [æ] / __tional: national rational

21,3

-sion i → [ɪ] / __CV: vision

21,4

-ture a → [æ] / __CV: stature natural

Block 22

22,1

Stress pattern 3B

$V \rightarrow [\check{V}] / \_\_CV$

anecdote aqueduct bobolink calico
celebrate criticize crocodile decorate
dedicate democrat demonstrate dividend
dominate domino dramatize elevate
generate gratitude hemisphere hestitate
holiday imitate kerosene latitude
manicure manuscript memorize moderate (Vb)
modify nominate operate pacify
penetrate populate ratify recognize

22,1 (con't)

regulate
ridicule
satisfy
Saturday
separate (Vb)
sterilize
stratosphere
telegram
telegraph
telephone
telescope
tomahawk
trapezoid
vagabond
valentine

s → [s] /V__V: paradise parasite parasol

ch → [š]: parachute

n → [n] /__[g]: nightingale

o → [ɔ]: alcohol

a → [ɔ]: almanac

a → [æ] /__CV; ue → Ø /g__#: catalogue

ae → [ɛ]: aeroplane

au → [aw]: sauerkraut

reservoir → [rɛ́zəv(w)ar] (P)

22,2

Stress pattern 3A

V → [V̆] /__CV

abacus (P,AS)
animal
banister
benefit
cabinet
calendar
Canada
canopy
capital
capitol
chemical
chemistry
cholera
citizen
colonist
colony
comedy
criminal
decimal
definite
delicate
diligent
document
ebony
elegant
element
elephant
enemy
energy
feminine
granary
gravity
halibut
hominy
Italy
janitor
liberty
liniment
majesty
medical
medicine
melody
mineral
minister

22,2 (con't)

miracle misery moderate(Aj) monitor
monument negative pelican platinum
policy popular positive predicate
president primitive probable probably
prominent property regiment register
regular relative remedy residence
resident senator similar skeleton
specimen tapestry tenement vanity
vinegar visible

e → [ε] /__CV; e → [i] /__#: recipe

re → [ər]: massacre

a → [ε]: marshmallow

s → [s] /V__V: fuselage (P) pleurisy (also eu → [u])

s → [z]; p → Ø /__b: raspberry

22,3

Stress pattern 3C

V → [V̌] /__CV:

abacus (P,AS) alpaca banana composite
consider continue contribute develop
distribute enamel exquisite imagine
imprison improper pajamas sombrero
soprano

e → [i] /__#: adobe coyote (P)

also a → [a]: karate serape tamale

ow → [a]: acknowledge

d → Ø /#a__j: adjacent

all → al [ɔl]: almighty

22,3 (con't) c → Ø: antarctic acquaintance

u → [w] /...g__: distinguish

o → [o]; g → Ø; a → [i]: bologna

ieu → [u]; e → [ɛ] /__CV: lieutenant

22,4

Stress pattern 3D

V → [V̆] /__CV:

cigarette	matinee (also ee → [e])		recollect
recommend	referee	refugee	volunteer

qu → [k]: masquerade

que → [k] /__#: picturesque

s → Ø: Illinois (P)

Recommended Order of Instruction for Irregularly-Spelled Words in Fourth Year

Frequency = 384

Block 23

23,1

A29 a → [e] / __CC: chamber

A24 ea → [e]: breakwater

23,2

135 V → [V̆] / __CV: chili gasoline khaki (also kh → [k])
magazine vasoline

s → [s] /V__V: valise

ue → Ø /g__#: fatigue

que → [k] /__#: antique unique

qu → [k]: mesquite mosquito

u → [w]: suite

ch → [š]: machine

gh → [g]: spaghetti

zz → [ts]: pizza

ll → [y]: tortilla

ai → [ay]: Hawaii

125 h → Ø: dahlia (or a → [e]; h → Ø: dahlia)

shion → [šən]: cushion fashion old-fashioned

p → Ø /#__C (C ≠ r, l); eu → [u]: pneumonia

V → [V̆] / __CV: companion dominion familiar
opinion spaniel Virginia

23,3

Y11 rh → [r]: rhyme

a → [æ] /__CV: analyze

Y13 y → [ɪ] /__CV: chrysalis cylinder hypocrite

myriad physical pyramid

sycamore synagogue (also o → [a], [ɔ] /__CV; ue → ∅ /g__#)

synonym syrup(P) typical tyranny

y → [ay] /__$\left\{\begin{matrix}ph\\th\end{matrix}\right\}$V: hyphen scythe typhoon

y → [ə] in unstressed syllables: oxygen

platypus

V → [V̆] /__CV: amethyst

x → [z] /#__: xylophone

Y15 y → [ə] /__r: martyr myrrh (also rrh → [r])

n → ∅ /m__#: hymn

Block 24

24,1

four-syllable compounds

V → [V̆]/__CV: citizenship supervision vice-president

watermelon

o → [u] /__v: self-improvement

o → [o] /__thV: underclothing

a → [æ] /__nge: Los Angeles (P)

four-syllable words with suffixes

-er a → [æ] /__CV: atomizer

o → [u]: evildoer

24,1 (con't) -or V → [V̆]/__CV: elevator generator operator
regulator separator speculator

-ly V → [V̆] /__CV: definitely moderately regularly

b → Ø /__t#: undoubtedly

24,3

E38 a → [ə]: whatever

ere → [ɛr]: wherever

who → [hu]: whoever

U38 u → [ə] /__C ish: punish punishment

24,4

General primary vowel Rule 27

u → [yu] /__C ity (Rule U13): community security

o → [ɔ] /__C ity (Rule O21): authority (also au → [ə]) majority

a → [a] (Rule A24): equality

Block 25

25,1

-tion V → [V̆] /__CV: benediction celebration decoration
dedication demonstration elevation
generation hesitation imitation
legislation operation population
regulation resurrection salutation
sanitation satisfaction separation
vegetation

i → [ɪ] /__tion: exhibition expedition
recognition (also e → [ɛ] /__CV)

25,2

I26 ue → Ø /g__#: dialogue

U26 V → $[\breve{V}]$ /__CV: genuine manual minuet

oy → [i]: buoy (or buoy → [boy])

E26 V → $[\breve{V}]$ /__CV: linear stereo

O26 e → [ɛ] /__CV: heroine

25,3

I36 V → $[\breve{V}]$ /__CV: idiot patio piano

pianist(P)

o → [o] /__thV; th → [ð]: clothier

ae → [ɛ]: aerial

25,4

A12, O12

re → [ər] /C__#: acre ogre

Y12 y → [ɪ] /__Cle#: bicycle tricycle

25,5

E14 e → [ɛ] /__C$\{^{r}_{l}\}$V: leprechaun petrify

pueblo (also u → [w]) recreation

represent

I14 s → Ø: isle island

O14 o → [a] /__C$\{^{r}_{l}\}$V: proclamation progress

U14 u → [ə] /__ClV: public publication publish

publisher quintuplet republic

A14 a → [æ] /__C$\{^{r}_{l}\}$V: acrobat acrobatic Africa

apricot(P) declaration establish

sacrifice

Block 26

26,1

-able V → [V̆] /__CV: honorable manageable miserable preferable

shion → [šən]: fashionable

-ment V → [V̆] /__C(l)V: development establishment

-al V → [V̆] /__CV: additional mechanical

-ist o → [a] /__CV: pathologist

26,2

IE17 a → [æ] /__CV: calorie

au → [æ]: auntie (P)

o → [u] /__v: movie

EY17 s → [z]: jersey

o → [ə] /__r: attorney

26,3

AI17 ea → [e]; i → [ɪ] /__CV: Great Britain

26,4

EA33 s → [s] /V__V: research

ea → [ə] in unstressed syllables:

pageant (also a → [æ] /__CV)

sergeant (also e → [a])

vengeance

26,5

IE12 ie → [ɪ]: handkerchief (also d → Ø)(P) kerchief

mischief sieve

s → [z]: rabies series

26,5 (con't) ie → [ɛ]: friend friendly friendship unfriendly

ie → [ay]: fiery

i → [ɪ] /__nd#: windshield

ch → [š]: chandelier

EI10 ei → [e]: heir heiress their theirs veil

ei → [ɪ]: counterfeit forfeit

ei → [ay]: height

ei → [ɛ]: heifer

p → Ø /__t#: receipt

ei → [ə] in unstressed syllables: foreign

26,6

EY10 ey → [i]: key keyboard keyhole

ey → [ay]; s → [z]: geyser

26,7

-ous V → [V̆] /__CV: generous hideous perilous vigorous

ie → [ɪ]: mischievous

OU31 V → [V̆] /__CV: Plymouth

s → [s] /V__V: courtesy

gh → [f]: enough rough roughly tough

ch → [š]: moustache

OU35 all → al [ɔl]: although

s → [s] /V__V: resource

qu → [k]; et → [e] /__#: bouquet(P)

26,7 (con't) OU33 ou → [ʊ]: boulevard

g → [ž]: rouge

OU34 gh → [f]: cough trough (or gh → [θ])

Block 27

27,1

in- V → [V̌] /__CV: incredible invisible

dis- a → [æ] /__CV: dissatisfied

27,2

Stress pattern 4A

V́ → [V̌] /__CV: academy affiliate(N) America

American amphibian anonymcus

apology astronomer astronomy

barometer certificate continuous

diagonal diameter divisible

economy experiment geometry

harmonica imperative inadequate

indelible inquisitive irregular

magnificent mahogony meridian

monogamy monopoly municipal

original particular perimeter

philosopher political

rhinoceros (also rh → [r]) ridiculous

speedometer thermometer(P)

$V \rightarrow [\check{V}] \;/\; \_\_C\left\{{}^{r}_{l}\right\}V$: biography democracy geography

republican stenographer

y → [ə]; s → [s] /V__V: chrysanthemum

27.2 (con't) Stress pattern 4B

V → [V̆] /__CV: accomodate affiliate(Vb) anticipate
apologize commemorate consolidate
co-operate deliberate(Vb) elaborate(Vb)
evaporate homogenize inoculate
participate

27.3

Stress pattern 4C

V → [V̆] /__C(r)V: anesthetic California Colorado
Colisseum epidemic
gladiolus macaroni manufacture
mathematics memorandum operetta
penicillin psychedelic (also p → Ø /#__C;
y → [ay] /__chV) semicolon
tapioca

e → [e]: señorita (also n → [ny]) (P)
ukelele (also e → [i] /__#)

all → al [ɔl]: altogether

27.4

Stress pattern 4D

$V \rightarrow [\breve{V}] / \_\_C(\begin{Bmatrix} r \\ l \end{Bmatrix})V$: agriculture caterpillar (also r → Ø)
cemetery ceremony dromedary
February helicopter(P) January
legislative literary melancholy
military millinery monastery

27,4 (con't) necessary pomegranate ragamuffin
sanitary secondary secretary
seminary solitary stationery
tabernacle television tributary

e → [e]: carburetor

27,5

other four-syllable words

-ism → [ɪzəm] /__#:

communism rheumatism (also rh → [r]; eu → [u])

also V → [V̆] /__CV: catechism criticism

V → [V̆] /__CV: capitalize equitable literature
mademoiselle (also oi → [ə]) miniature

27,6

E32 V → [V̆] /__CV: adenoid adenoids camera
celery emerald everybody
federal general generally
liberal reference vegetable
veteran

ei → [ɪ]: sovereign

ch → [š]: machinery

one → [wən]: everyone

ere → [ɛr]: everywhere

032 V → [V̆] /__CV: brocolli chocolate(P)
licorice (also c → [š]) memory

27,6 (con't) A32 V → [V̆] /__CV: salary separate separately

æ → [æ], r → Ø: sarsaparilla (P)

a → [a]: caramel (P)

132 a → [æ] /__CV: family

Additional irregularly spelled words

(See also Section V)

eau → [o]: bureau plateau (also a → [æ] /__CV)

eau → [yu]: beautiful beautifully (P) beautify

beauty

eo → [ə] in unstressed syllables: dungeon

luncheon pigeon (also i → [ɪ] /__CV)

surgeon

eo → [i]: people

eo → [ɛ]: leopard

et → [e]: ballet buffet

x → [gz] /$V_{unstressed}$__V: exact exalt

exam example exert

exhaust exhibit exist

existence

also V → [V̆] /__CV: examination

examine executive

ae → [i]: sundae

aa → [a]: bazaar

au → Ø: restaurant

monsieur → [məsyə́r]

aisle → [ayl]

Section IV

Sequenced Proper Names

In Cronnell (1969a) nearly 500 proper names (primarily first names, but some surnames) were listed for use in beginning reading instruction. In this section these names are sequenced according to the rule sequence as found in Section II (summarized in Appendix C). Each name is introduced as an exemplar of a spelling-to-sound correspondence when all other correspondences in the name have been previously introduced. (If a rule has no name exemplars, it is not listed in this section.)

Following the sequenced names, irregularly-spelled names are sequenced, using the same methods as used in Section III for irregularly-spelled words.

Sequenced Proper Names for First Year

Frequency = 65

Block 1

1,1

N10, NN10, T10, A15

Ann Nan Nat

1,2

P10 Pat

1,3

L10 Al Lil

S10 Stan

1,4

D10 Dan Sid

E15 Ed Les Len Ned Ted

1,5

M10 Matt Mil Milt Pam Sam Tim

B10 Bill Ben

U15 Bud Jud

1,6

R10 Rob Ron

H10 Hill

O15 Bob Don Dot Tod Tom

Block 2

2,2

TH11 Beth Smith

Block 3

3,1

EE10 Lee

Block 4

4,1

F10 Fran Fred

W10 Will

4,2

K10 Ken Kent

N20 Hank Frank

C12 Cal Mac Scot

CK10 Dick Mack Nick Rick

4,3

G12 Glen Glenn Green Greg Gwen

4,4

J10 Jack Jan Jeff Jill Jim Jon

X10 Max Rex

4,5

V10 Bev Van Vic

Sequenced Proper Names for Second Year

Frequency = 159

Block 6

6,1

A11	Dale	Dave	Jake	Jane	Kate	
I11	Mike					

6,2

O11	Hope					
U11	June					
E11	Eve	Pete	Steve			

Block 7

7,1

C11	Bruce	Grace				
G11	Gene					

Block 9

9,1

A21	Art	Bart	Carl	Clark	Karl	Mark
U21	Burt	Curt	Kurt			
I21	Kirk					
E21	Bert	Herb	Sherm			

9,2

E21	Albert	Herbert	Miller			
U21	Turner	Wilbur				
A21	Arthur	Parker				

Block 10

10,1

I17	Alvin	Calvin	Dennis	Doris	Francis	Martin
	Marvin	Melvin				
U17	Edmund					
E17	Agnes	Alfred	Allen	Ellen	Ernest	Ethel
	Frances	Kenneth	Mildred	Warren		
A17	Allan	Anna	Bernard (P)		Brenda	Cora
	Donna	Edgar	Edna	Edward	Ella	Emma
	Herman	Linda	Lora	Marsha	Martha	Nora
	Norma	Sandra	Sherman	Stella	Thelma	
O17	Arnold	Burton	Clifford	Gordon	Milton	Nelson
	Victor	Wilson				

10,2

Y17	Abby	Andy	Becky	Betsy	Betty	Billy
	Bobby	Buddy	Cathy	Cindy	Danny	Denny
	Gerry	Ginny	Henry	Holly	Jerry	Jimmy
	Kathy	Kenny	Lanny	Molly	Nancy	Nicky
	Patsy	Patty	Penny	Polly	Randy	Sally
	Sammy	Sandy	Sherry	Terry	Tommy	Vicky
	Wendy					

10,4

A21	Arlene	Marlene		
EE10	Cathleen	Doreen	Kathleen	Noreen

10,5

E17	Jerome

Block 11

11,2

CH10 Chuck Richard

11,3

WH10 White

11,4

GG10 Peggy

11,6

G31 Gertrude Gil Gilbert

Block 12

12,1

AY10 Fay Gay Jay Kay May Ray
Raymond Taylor

12,2

EA11 Bea Dean Jean Neal

12,5

OW12 Brown Howard

Block 13

13,2

A23 Walt Walter

13,3

O24 Ross

Block 14

Anne Annette Constance Faye Florence Moore
Vance Wayne

Sequenced Proper Names for Third Year

Frequency = 95

Block 16

16,1

AI10 Claire Craig(P) Faith Gail Lorraine

16,3

OE10 Joe

OA10 Joan

16,4

AW10 Lawrence

AU10 Laura Maureen Maurice Paul Paula Saul

16,5

OY10 Boyd Joy Joyce Lloyd Roy

16,6

UE10 Sue

EW10 Andrew Lew Lewis Stewart

Block 17

17,2

-s Charles James Jones

Block 18

18,1

E13 Edith Elaine Eva Peter Vera

O13 Lola Roland Tony

A13 Ada Amy David Davis Hazel Jacob Mabel Nathan

I12 Irene

U13 Hubert Judith Judy Lucy Rudy

18,2

S20 Joseph(P) Lisa(P) Rose Susan Susanne

18,3

A22 Barry Carol Carole Cary Clara Gary Harold
Harry Karen Larry Mary Rosemary Sara Sharon

18,4

025 Jo Margo

Block 19

19,2

H20 John Johnny Johnson Sarah

Block 20

20,2

PH10 Phil Phillip Ralph Randolph(P) Rudolph(P)

CH31 Chris

Block 22

22,2

Stress pattern 3A

Allison Anderson Anthony Benjamin Christopher
Jacqueline Jennifer Jessica Peterson

22,3

Stress pattern 3C

Dolores Loretta Melissa Priscilla Rebecca Roberta

Sequenced Proper Names for Fourth Year

Frequency = 103

Block 23

23,1

A24 Wanda

23,2

I35 Anita Bernice Christine Josephine (P)
Lucille Pauline Rita Toni

I25 Cecilia Celia Julia William Williams

23,3

Y11 Clyde

Y15 Carolyn Cathryn Gwendolyn Kathryn Lynn
Marilyn

Y16 Phyllis

Block 24

24,2

E38 Beverly Evan Kevin

Block 25

25,2

I26 Brian

U26 Stuart

E26 Andrea Beatrice Leon Theodore

O26 Joanna Joanne Joel Lois

25,3

I36 Cynthia Gloria Harriet Lillian Marion
Sylvia Victoria Vivian

25,5

A14 Adrienne April

Block 26

26,2

IE17	Annie	Archie	Bernie	Bessie	Bobbie
	Bonnie	Carrie	Cathie	Charlie	Connie
	Eddie	Ellie	Elsie	Ernie	Freddie
	Howie	Jackie	Jeannie	Jennie	Julie
	Katie	Laurie	Leslie	Margie	Nellie
	Robbie	Ronnie	Susie		
EY17	Audrey	Dudley	Harvey	Jeffrey	Mickey
	Rodney	Shirley	Sidney	Stanley	

26,4

EA33	Earl

26,5

EI10	Keith	Neil	Sheila

26,7

OU31	Doug	Douglas	Young		
OU33	Lou	Louie	Louis	Louisa	Louise

Block 27

27,6

E32	Catherine	Evelyn	Katherine	Margery
A32	Barbara	Margaret		
O32	Dorothy	Marjorie	Nicholas	

SEQUENCED IRREGULARLY-SPELLED PROPER NAMES

Recommended Order of Instruction for Irregularly-Spelled Proper Names in Third Year

Frequency = 37

Block 16

16,6

EW10 eu → [yu]: Eugene Eunice

Block 18

18,1

E13 e → [ɛ] /__CV: Eric Helen

O13 o → [a] /__CV: Donald Robert Roger Ronald

A13 a → [æ] /__CV: Adam Alan Alex Alice Janet Janice

a → [a]: Lana

a → [e] /__chV: Rachel

18,4

O25 u → [u] /__#: Stu

Block 19

19,2

GH10 u → [yu]: Hugh

19,5

L20 l → Ø: Malcolm

Block 20

20,2

PH10 e → [i] /__phV; ph → [v]: Stephen

CH31 ch → [š]: Charlene Charlotte Michelle

20,3

TH12 th → [t]: Esther Thomas (also o → [a] /__CV) Thompson

tth → [θ]: Matthew

Block 22

22,1

Stress pattern 3B

$V \rightarrow [\breve{V}]$ /__CV: $\underline{\text{A}}$bigail $\underline{\text{I}}$sabel

22,2

Stress pattern 3A

$V \rightarrow [\breve{V}]$ /__CV: $\underline{\text{E}}$mily Gr$\underline{\text{e}}$gory J$\underline{\text{o}}$nathan M$\underline{\text{a}}$deline

$\underline{\text{O}}$liver P$\underline{\text{a}}$mela T$\underline{\text{i}}$mothy

22,3

Stress pattern 3C

$\underline{\text{th}} \rightarrow [t]$; $\underline{\text{s}} \rightarrow [s]$ /V__V: $\underline{\text{Th}}$ere$\underline{\text{s}}$a

Recommended Order of Instruction for Irregularly-Spelled Proper Names in Fourth Year

Frequency = 28

Block 23

23,2

I35 Elosie → [ɛ́ləwiz]

e → [ɛ] /__CV: Geraldine

I25 V → [V̆] /__CV: Daniel Virginia

Block 25

25,2

I26 a → [æ] /__CV: Diana Diane

U26 a → [æ] /__CV: Samuel

25,5

E14 e → [ɛ] /__CrV: Debra

A14 a → [æ] /__CrV: Patrick

Block 26

26,2

IE17 ie → [i] in unstressed syllables: Marie

a → [æ] /__CV: Natalie Valerie

26,4

EA33 ea → [ə] in unstressed syllables:

Eleanor (also e → [ɛ] /__CV) Jeanette

26,5

IE12 ei → [ay]: Eileen

Block 27

27,6

E32 e → [ɛ] /__CV: Frederick

032 e → [ɛ] /__CV: Deborah

27,2

Stress pattern 4A

V → [V̆] /__CV: Elizabeth Nathaniel

Penelope (also e → [i] /__#)

27,3

Stress pattern 4C

a → [æ] /__CV: Alexander

Miscellaneous

cia → [šə]: Marcia Patricia (also i → [ɪ] /__CV)

u → [u]: Ruth

i → [ay] /__chV; ae → [ə]: Michael

ae → [e]: Rae

eo → [ɛ]: Leonard

ge → [ǰ]: George

Section V

Unsequenced Additional Words

Frequency = 245

In addition to the words sequenced in Sections II to IV of this volume there remain a number of words which were not sequenced. Because of the variety of these materials, it was decided to present them all in one section, rather than to attempt to sequence them (as, for example, a Block 28). Irregularly-spelled words are included, with the irregular grapheme units underlined (mostly exceptions to general primary vowel Rule 13).

A. Five- and six-syllable words Frequency = 108

All of the rules involved in these five- and six-syllable words have been introduced in Blocks 1-27. The only new thing is increased word length.

1. Five-syllable words Frequency = 99

a. Five-syllable words with affixes Frequency = 62

-tion	abbreviation	administration	association(P)
	civilization	communication	confederation
	co-operation	denomination	emancipation
	evaporation	imagination	inauguration
	incorporation	interrogation	intoxication
	investigation	multiplication	organization
	recommendation	representation	
-ly	absolutely	accidentally(P)	affectionately
	approximately	continually(P)	exceptionally(P)
	immediately	industriously	occasionally(P)
	originally	particularly(P)	

-ity	curiosity	electricity	hospitality
	legibility	opportunity	personality
	popularity	probability	university
-al	agricultural	alphabetical	consitutional
	editorial	experimental	geographical
	international	oratorical	paradoxical
	periodical	transcontinental	
un-	uncomfortable(P)	unnecessary	unreasonable
	unsanitary		
dis-	disagreeable	disobedience	
other:	abolitionist	confectionary	imaginable
	indivisible	revolutionize	

b. Other five-syllable words   Frequency = 37

amplitheater	anniversary	appendicitis
archipelago	auditorium	cafeteria
cock-a-doddle-do	delicatessen	denominator
entymology	evaporated	exclamatory
hippopotamus	hydroelectric	imaginary
inimi[illegible]le	innumerable	inseparable
inter[illegible]ate	interrogative	irreproachable
manufactory	metropolitan	miscellaneous
observatory	patriotism	Pennsylvania
preliminary	refrigerator	representative
sanatorium	superintendent(P)	theological
tuberculosis	veterinary	veternarian
vocabulary		

2. Six-syllable words   Frequency = 9

capitalization   characteristic   encyclopedia
extraordinary(P)   oleomargarine   revolutionary
satisfactorily(P)   unconstitutional   unsatisfactory

B. Palatalizations   Frequency = 137

Palatalizations, although relatively common, are rather complex (see Cronnell, 1969a, pp. 33-35). The three most frequent palatalizations--tion, sion, ture--are found in Section II (21,2; 21,3; 21,4; 25,1). The remaining palatalizations are listed below.

1. a. -cial → [šəl]:

artificial   beneficial   commercial   especially(P)
financial   judicial   official   social
special   specialist   specially(P)   specialty

b. -sure → [žər]:

exposure   leisure   measure   measurement
pleasure   treasure   treasurer   treasury

c. -ssure → [šər]:

assure (or [šur])   pressure

d. -tune → [čun] (or [čən]):

fortunate   fortunately   fortune   fortune-teller
misfortune   unfortunately

2. a. -sia → [žə]:   Asia   Persia

b. -sian → [žən]:   artesian

c. -ssian → [šən]:   Russian

d. -cian → [šən]:   electrician   magician   physician
politician

e. -cient → [šənt]: ancient efficient sufficient sufficiently

f. -science → [šəns]: conscience

g. -ciency → [šənsi]: efficiency proficiency

h. -tient → [šənt]: impatient impatiently patient patiently quotient

i. -tience → [šəns]: patience

j. -tia → [šə]: militia

k. -tial → [šəl]: essential initial partial residential

l. -dial → [ǰəl]: cordial cordially

3. a. -tious → [šəs]: ambitious cautious cautiously nutritious superstitious

b. -teous → [čəs]: righteous

c. -gious → [ǰəs]: contagious religious

d. -geous → [ǰəs]: advantageous courageous gorgeous outrageous

e. -cious → [šəs]: delicious ferocious gracious precious spacious suspicious vicious

f. -scious → [šəs]: conscious unconscious

g. -xious → [kšəs]: anxious anxiously

4.	a. -ci- → [ši]:	appreciate	appreciation	associate
	b. -ti- → [ši]:	initiate		
	c. -su- → [žu]:	unusual	unusually	usual
	d. -tu- → [ču]:	actual	actually(P)	congratulate
		congratulation	eventually(P)	mature
		punctual	punctuality	punctuation
		spiritual(P)	statuary	statue
	e. -tur(e) → [čər]:	natural (P)		
		naturally(P)	saturate	unnatural(P)
	f. -teur → [čər]:	amateur	pasteurization	pasteurize
	g. -du- → [ǰu] (or [ǰə]):	educate	educated	education
		educational	gradual	graduate
		graduation	individual	pendulum
		schedule	situate	situation
5.	a. -tian → [čən]:	Christian		
	b. -xion → [kšən]:	complexion	complexioned	
	c. -cean → [šən]:	Atlantic Ocean	ocean	Pacific Ocean
	-ce → [ši]:	oceanic		
	d. -gion → [ǰən]:	legion	region	religion
	e. -dier → [ǰər]:	soldier		
	f. -cier → [šər]:	glacier		
	g. -zier → [žər]:	glazier		
	h. -sier → [žər]:	hosiery		
	i. -ssue → [šu]:	issue	tissue	
	j. -sur- → [šər]:	insurance		

k. -xur- → [kšər]: luxury

l. -cies → [šiz]: species

m. -tio → [šo]: ratio

Errata and Addenda

After this report was completed, some errors were discovered, which, however, should not substantially affect the usefulness of the materials. In addition, a number of words were inadvertently omitted; these should be checked by program developers to add words necessary for reading.

Words sequenced twice

The following words were sequence twice; they are listed below, in sequence, with the position from which they should be deleted. In parentheses, is the position at which they do and should properly occur.

8,2	A16	accent	(20,4 CC11)
8,2	O16	object (N)	(10,1 E17)
10,1	I17	public	(ir* 25,5 U14)
10,1	I17	publish	(ir 25,5 U14)
10,1	E17	midget	(14,1)
10,4	A16	accept	(20,4 CC11)
19,1	-*ance*/-*ant*	acceptance	(20,4 CC11)
27,6	A32	separate (Aj)	(ir 27,6 A32)
Section V, B4		natural	(ir, 21,4 -*ture*)

Words improperly included

The following words were mistakenly included, although not in the Berdiansky *et al*. (1969) lexicon. They should be deleted (unless desired by program developers).

17,3	-*er*	retainer
24,1	-*en*	undertaken
24,3	Y28	physics
ir 11,1	NG10	lengthen
ir 27,2	SP4A	monogamy

Additions

The following words were mistakenly omitted from the Berdiansky *et al*. (1969) lexicon. They should be added there and sequenced as follows.

coolie	26,2	IE17
freeway	12,1	AY10

---

*ir = irregularly spelled words, Section III of this volume.

Addenda

The following words were in the Berdiansky et al. (1969) lexicon, but were not sequenced. They should be placed in the sequence as follows.

2,1	SH10	shop		
5,1		big shot		
6,1	A11	scrape		
9,2	E21	ferment (N)		
10,1	E17	bidden		
10,2	Y17	angry		
10,4	E21	ferment (Vb)		
10,5	E17	extent		
11,3	WH10	big wheel		
12,1	AY10	today		
12,2	EA11	appear	beard	beaver
		speak		
	EA31	meant		
12,4	OW11	shallow		
13,3	O24	throng		
14,1		fringe	hinge	lacrosse
		plunge	sponge	
15,2		divine	export	goddess
		import	instinct	manful
		provoke	shortage	vista
16,1	AI10	pigtail	rainbow	rainstorm
		trailer	training	
16,3	OA10	coat		
17,1		boll weevil	counterpane	pall bearer
17,2	-er	server		
	-s	pincers		
	-ed	doctored		
18,1	E13	besides	retailer	
	O13	cocoa		
18,2	S10	muse		
18,4	O25	burro	tho	
19,1	-ance/ -ant	descendant	reliance	

20,1	-ful	unhealthful		
20,3	TH12	brotherhood		
22,1	SP3B	phonograph		
22,2	SP3A	bacterin	compliment	copilot
		practical	popsicle	portable
22,3	SP3C	heroic	resemble	
22,4	SP3D	guarantee		
23,1	A24	washbasket		
23,2	I35	handicap		
24,1	compounds	self-reliance		
24,3	O28	depositor		
24,4		gravity	prosperity	
25,1		proposition		
25,2	U26	duofold		
	O26	oasis		
25,3	I36	guardian	median	radiator
25,5	A14	fragrant	patriot	
26,7	-ous	glorious		
	OU31	tournament		
	OU35	fourteenth	mourning	
27,2	SP4A	affectionate	parenthesis	
27,6	E32	differently	temperature	

Irregulary-spelled words (Section III)

4,1	F10	mama	pa	
10,2	Y17	many		
12,2		beefsteak		
15,1		bye-bye		
15,2		forbade		
17,3	-ly	heartily		
18,1	E13	very		
	O13	modern	produce (N)	product
	I13	lily		
18,2	S20	basin	business	

19,1	-ment	improvement		
19,2	H20	oh		
19,3	G20	champagne		
19,6	U20	plaque		
after 19,6		condemn	damn	
20,2	CH31	headache		
21,2		ambition	translation	
21,3		precision		
22,1	SP3B	monogram		
22,2	SP3A	vocative		
23,2	I25	frijoles		
23,3	Y15	rhythm		
	Y13	typhoid		
25,1		valuation		
25,5	I14	triple		
26,5	EI10	seive		
27,3	SP4C	apparatus		
after 27,6		beau	exactly	exempt
		yeoman		

Section V

A1	enthusiastic	manufacturer	
	necessarily		
A2	responsibility		
B1	unfortunate		
B4	gradually	pasteurizer	usually
B5	luxurious		

APPENDIX A

Key to Pronunciation and Symbols

Key to Pronunciation

The following phonetic symbols are used to indicate pronunciation. The symbols used in *Webster's New World Dictionary* (1957) are given on the right for reference.

Symbol	Key words (corresponding graphemes underlined)		Dictionary Symbol
Vowels			
[i]	scene, neat, see, chief		ē
[ɪ]	bit, hidden		i
[e]	name, day, they		ā
[ɛ]	get, head		e
[æ]	fat, bad		a
[a]	hot, car		o
[ɔ]	song, loss, taught, lawn, talk, ball, thought		ô
[o]	bone, go, fork, toe, board, know		ō
[ʊ]	put, push, book, could		oo
[u]	food, dew, tune		o͞o
[ə]	but, above	(unstressed) (stressed)	ə u
[ay]	cry, mine, die		ī
[aw]	found, owl		ou
[oy]	boy, noise		oi

Symbol	Key words (corresponding graphemes underlined)	Dictionary Symbol
Consonants		
[b]	boy, cab	b
[č]	church, chip, hatch	ch
[d]	dead, do	d
[f]	fun, fair, off	f
[g]	go, gay, egg	g
[h]	home, head	h
[ǰ]	judge, gem, age	j
[k]	kill, kick, come, cat	k
[l]	let, little	l
[m]	man, ham	m
[n]	no, hand	n
[ŋ]	sing, single, think	ŋ
[p]	pull, trip	p
[r]	red, far	r
[s]	see, ice, miss	s
[š]	she, sure, issue, nation, hash	sh
[t]	ten, hit, liked	t
[v]	vase, love	v
[w]	wet, language, quick	w
[y]	yet, you	y
[z]	zoo, lazy, please, wives	z
[ž]	vision, treasure	zh
[θ]	thing, bath	th
[ð]	them, bathe	*th*

Key to Symbols

Parts of speech

Aj = adjective

N = noun

Vb = verb

Other symbols

P = alternate pronunciation (e.g., for either, route)

AS = alternate stress pattern (e.g., for invalid), generally also involving an alternate pronunciation (P)

e̸ = a final silent e (Rule E18) which is dropped when adding a suffix (e.g., hīde, hiding)

V = vowel

C = consonant

Ø = silent letter

Symbols used in stating rules of correspondence are described in Berdiansky, Cronnell, and Koehler (1969, pp. 14-15). Additionally, in the present report, the arrow (→) is sometimes used to represent a orthographic change: e.g., y → i + ly (i.e., y becomes--is changed to--i when ly is added, e.g., happy, happily).

APPENDIX B

Glossary

AFFIX: a nonfree form added to a word to make a new word, e.g., the *un-* in *unfair*, the -*s* in *boys*. Affixes include both prefixes and suffixes.

BASE (WORD): a word to which an affix is added forming a new word; e.g., *boy* is the base in *boys*.

COMPOUND: a word composed of two (or more) words, e.g., *goldfish*, *houseboat*.

CONSONANT DIGRAPH: a grapheme unit composed of two or more consonant letters, e.g., *th*, *ck*, *qu*.

DOUBLE CONSONANT: a grapheme unit composed of two occurrences of the same consonant, e.g., *dd*, *ll*. Because of English phonotactics, most spelled double consonants are pronounced the same as a single consonant, e.g., *d* → [d], *dd* → [d]. Because of environmental constraints on *c* and *g*, this does not completely apply to *cc* and *gg*; nor does it apply to words containing morpheme boundaries, e.g., *dd* → [dd] in *midday*. The term "geminate" is sometimes used when describing double consonants.

ENVIRONMENT: other letters or sounds in a word which affect a spelling-to-sound correspondence. Indicated by a slash (/) and by underlining in the position of the correspondence. E.g., the environment /__r means that the correspondence occurs when the grapheme unit is followed by *r*.

EXCEPTION: a grapheme unit in a word for which no (listed) spelling-to sound correspondence is applicable. Words containing exceptions are also called exceptions. Since such exceptions were coded "40," the words are sometimes known as "*40* words." The term "irregular" refers to exceptions.

EXEMPLAR: a word containing a particular spelling-to-sound correspondence.

GRAPHEME: a unit of an alphabet; a letter. For English, any of the 26 letters.

GRAPHEME UNIT: one or more letters (graphemes) functioning as a unit in deriving spelling-to-sound correspondences, e.g., *a*, *t*, *mm*, *oy*, *th*, *qu*. Whatever is on the left-hand side of a rule of correspondence is a grapheme unit.

IRREGULAR: see EXCEPTIONS.

MULTISYLLABLE: a word of two or more syllables.

PRIMARY VOWEL: a grapheme unit composed of a single vowel letter, i.e., *a*, *e*, *i*, *o*, *u*, *y*.

RULES OF CORRESPONDENCE: see SPELLING-TO-SOUND CORRESPONDENCE.

SECONDARY VOWEL: a grapheme unit composed of two (or more) vowel letters, e.g., *ee*, *oa*, *ay*. Also called "vowel digraph."

SILENT LETTER: a letter in a word for which there is no corresponding sound in the pronunciation of the word (symbolized by Ø). Some silent letters mark the pronunciation of other letters, e.g., the *e* in *name*; some are graphotactic devices, e.g., the *e* in *have*; some are anachronisms or scribal inventions, e.g., the *gh* in *bough*, the *b* in *debt*.

SPELLING-TO-SOUND CORRESPONDENCE: the relationship between the spelling and pronunciation of a grapheme unit. Also called spelling-to-sound correspondence rules and rules of correspondence (rules, for short).

STRESS: the degree of prominence found on a syllable. The basic distinction in spelling-to-sound correspondences is between stressed (marked ′ over a vowel) and unstressed (unmarked) syllables. In polysyllabic words it is useful to recognize two levels of stress: primary (′) and secondary (\`), e.g., *accómmodàte*. Stress is sometimes called accent.

SYLLABLE: a segment of speech containing one vowel sound and optional consonant sounds. (In addition, certain consonant sounds may be syllabic).

APPENDIX C

Summary of Rule Sequence

FIRST YEAR

Block 1

1,1	N10, NN10, T10, (TT10)[8], A15, I15
1,2	P10, (PP10)
1,3	L10, LL10, S10, SS10
1,4	D10, DD10, E15
1,5	M10, (MM10), B10, (BB10), U15
1,6	R10, (RR10), H10, O15

Block 2

2,1	SH10
2,2	TH13, TH11

Block 3

3,1	EE10, E25
3,2	Y19

---

[8] Block I double consonant rules in parentheses have no exemplars at the point where they are listed in the sequence. Nevertheless, they are included--with their corresponding single consonant rules--because both rules have the same pronunciation. In Volume I (Section II and in Appendix C) it is noted where exemplars of the parenthesized rules first appear.

Block 4

4,1	F10, FF10, W10
4,2	K10, N20, C12, CK10
4,3	G12
4,4	J10, X10, Y10
4,5	V10, Z10, ZZ10

SECOND YEAR

Block 5

5,1 Compounds using first year rules (first syllable stressed)

5,2 -ing suffix with previously introduced base words

5,3 -es suffix (plurals and third-person singular, present tense forms) of previously introduced base words

5,4 -ed suffix (past tense) of previously introduced base words

5,5 NG10 (one-syllable words)

Block 6

6,1 E18, A11, I11

6,2 O11, U11, E11, EE10 + E18

Block 7

7,1 C11, G11

7,2 -s, -d, and -ing suffixes added to words with general primary vowel Rule 11.

Block 8

8,1 Compounds with rules in Blocks 5-7

8,2 A16, I16, U16, E16, O16 (two-syllable words, first syllable stressed)

Block 9

9,1 A21, O21, U21, I21, E21 (one-syl[illegible]le words)

9,2 E21 (plus -er suffix with previously introduced words), U21, I21, A$\overline{21}$, O21 (two-syllable words, first syllable stressed)

9,3 A25, O22

Block 10

10,1 I17, U17, E17, A17, O17 (first syllable stressed)

10,2 Y17, LE22

10,3 Compounds (second syllable stressed)

10,4 I16, U16, A16, O16, E21, O21, EE10 (two-syllable words, second syllable stressed)

10,5 A17, E17, O17, U17, I17 (second syllable stressed)

Block 11

11,1 NG10 (two syllables)

11,2 CH10, TCH10

11,3 WH10

11,4 QU10

11,5 GG10, CC12

11,6 G31

Block 12

12,1 AY10

12,2 EA11, EA31

12,3 OO11, OO12

12,4 OW11, OW12

Block 13

13,1 O31, U31

13,2 A23, O23

13,3 I22, O24

Block 14

14,1 Stressed VCCe#

14,2 Stressed VrCe#

14,3 Unstressed VCCe# and VCe#

THIRD YEAR

Block 15

15,1 8-9 one-syllable word with first-year rules

15,2 8-9 words with second-year rules

Block 16

16,1 AI10

16,2 OU10

16,3 OE10, OA10

16,4 AW10, AU10

16,5 OI10, OY10

16,6 UE10, UI10, EW10

Block 17

17,1 Three-syllable compounds

17,2 Two-syllable words with suffixes: -er, -en, -ing, -y, -s, -ed

17,3 Three-syllable words with suffixes: -er, -en, -ing, -ed, -ly

Block 18

18,1 E13, O13, A13, I13, U13

18,2 S20, S21

18,3 A22

18,4 O25

Block 19

19,1 Three-syllable words with suffixes: -ment, -or, -ive, -ness, -ance, -ant

19,2 IE11, I24 + GH10, GH10, H20

19,3 K20, G20, W20

19,4 B20

19,5 L20, T20

19,6 U20

Block 20

20,1 Three-syllable words with suffixes: -y, -ful, -al, -able, -eth, -less, -ist, -ish

20,2 PH10, CH31

20,3 TH12

20,4 CC11

Block 21

21,1 Three-syllable words with prefixes: un-, re-, dis-, in-, mis-

21,2 -tion

21,3 -sion

21,4 -ture

Block 22

22,1 Stress pattern 3B

22,2 Stress pattern 3A

22,3 Stress pattern 3C

22,4 Stress pattern 3D

FOURTH YEAR

Block 23

23,1 A29, A24

23,2 I35, I25

23,3 Y11, Y13, Y15, Y16

Block 24

24,1 Four-syllable compounds
Four-syllable words with suffixes: -ing, -y, -er, -or, -en, -ed, -ly

24,2 E38, I38, A38, O38

24,3 A28, I28, Y28, O28, E28

24,4 General primary vowel Rule 27

Block 25

25,1 Four-syllable words with -tion

25,2 I26, Y26, U26, E26, O26, A26

25,3 I36, Y36

25,4 A12, I12, Y12, O12, U12

25,5 E14, I14, Y14, A14, O14, U14

Block 26

26,1 Four-syllable words with suffixes: -able, -ment, -al, -ness, -ary, -ist

26,2 IE17, EY17

26,3 AI17

26,4 EA33

26,5 IE12, EI10

26,6 EY10, EI20

26,7 -ous, OU31, OU35, OU33, OU34

26,8 UI31

Block 27

27,1 Four-syllable words with prefixes: un-, in-, dis-, mis-

27,2 Stress patterns 4A and 4B

27,3 Stress pattern 4C

27,4 Stress pattern 4D

27,5 Other four-syllable words (miscellaneous stress patterns)

27,6 E32, O32, A32, I32

APPENDIX D

Spelling-to-Sound Correspondences: Rule Description, Exemplars, Position in Sequence

Spelling-to-sound correspondences for primary vowels

Grapheme Unit	Rule #[a]	Rule Description	Examples	Position in sequence
A	11	$a \rightarrow [e] / \_\_Ce\#$	name, brave	6,1
	12	$a \rightarrow [e] / \_\_C\left\{\begin{smallmatrix} r \\ l \end{smallmatrix}\right\}e\#$	acre, stable	25,4
	13	$a \rightarrow [e] / \_\_CV$	baby, nature	18,1
	14	$a \rightarrow [e] / \_\_C\left\{\begin{smallmatrix} r \\ l \end{smallmatrix}\right\}V$	April, fragrant	25,5
	15	$a \rightarrow [\text{æ}] / \_\_C(C)\#$	sat, fast	1,1
	16	$a \rightarrow [\text{æ}] / \_\_CC....$	saddle, jacket	8,2
	17	$a \rightarrow [\text{ə}], [\text{ɪ}]$ in unstressed syllables	above, final	10,1
	21	$a \rightarrow [a] / \_\_\left\{\begin{smallmatrix} rC \\ r\# \end{smallmatrix}\right\}$	cart, car	9,1
	22	$a \rightarrow [\text{ɛ}], [\text{æ}] / \_\_r$	vary, marry	18,3
	23	$a \rightarrow [\text{ɔ}] / \_\_\left\{\begin{matrix} ll \\ lk \\ lt \\ ld \end{matrix}\right\}$	ball, walk, salt, bald	13,2
	24	$a \rightarrow [a], [\text{ɔ}] / \left\{\begin{smallmatrix} w \\ u \end{smallmatrix}\right\}\_\_$	wad, squat	23,1
	25	$a \rightarrow [o] / \left\{\begin{matrix} wh \\ w \\ qu \end{matrix}\right\}\_\_r$	wharf, war, quart	9,3

---

[a] For further description of these rules and of the rule notation, see Berdiansky, Cronnell and Koehler (1969), Cronnell (1971), and Section III of this report. Asterisked rules do not appear in the earlier reports.

Grapheme Unit	Rule #	Rule Description	Examples	Position in sequence
A	26*	$a \rightarrow [e]\ /\ \_\_\text{-V}$	mosaic	25,2
	27*	$a \rightarrow [\text{æ}]\ /\ \_\_\ C\ \text{ity}$	humanity, capacity	24,4
	28*	$a \rightarrow [\text{æ}]\ /\ \_\_C\begin{Bmatrix}\text{ic}\\ \text{id}\\ \text{ish}\\ \text{it}\end{Bmatrix}$	magic, rapid, radish, habit	24,3
	29	$a \rightarrow [e]\ /\ \_\_\begin{Bmatrix}\text{nge}\\ \text{ste\#}\end{Bmatrix}$	strange, paste	23,1
	32	$a \rightarrow \emptyset$	separate	27,6
	38	$a \rightarrow [\text{æ}]\ /\ \_\_\ \begin{Bmatrix}\text{vV}\\ \text{x(l)V}\end{Bmatrix}$	cavern, axis axle	24,2
E	11	$e \rightarrow [i]\ /\ \_\_\text{Ce\#}$	scene, here	6,2
	13	$e \rightarrow [i]\ /\ \_\_\text{CV}$	hero, meter	18,1
	14	$e \rightarrow [i]\ /\ \_\_C\begin{Bmatrix}r\\ l\end{Bmatrix}V$	zebra, declare	25,5
	15	$e \rightarrow [\varepsilon]\ /\ \_\_\text{C(C)\#}$	set, felt	1,4
	16	$e \rightarrow [\varepsilon]\ /\ \_\_\text{CC....}$	edge, extra	8,2
	17	$e \rightarrow [\text{ə}], [\text{ɪ}]$ in unstressed syllables	hidden, talent, magnet	10,1
	18	$e \rightarrow \emptyset\ /\ \_\_\#$	name, edge, immense, mice	6,1
	19	$e \rightarrow \emptyset\ /\ \_\_\begin{Bmatrix}s\\ d\end{Bmatrix}$	armed, wives	---[10]
	21	$e \rightarrow [\text{ə}]\ /\ \_\_\begin{Bmatrix}\text{rC}\\ \text{r\#}\end{Bmatrix}$	herd, father	9,1
	25	$e \rightarrow [i]\ /\#\text{(C)C}\_\_\#$	we, she	3,1
	26	$e \rightarrow [i]\ /\ \_\_\text{-V}$	create, meow	25,2
	27*	$e \rightarrow [\varepsilon]\ /\ \_\_\ C\ \text{ity}$	prosperity	24,4

---

[10] Not taught explicitly as a correspondence rule.

Grapheme Unit	Rule #	Rule Description	Examples	Position in sequence
E	28*	$e \rightarrow [\varepsilon] / \_\_C \begin{Bmatrix} ic \\ id \\ ish \\ it \end{Bmatrix}$	relic, cherish credit	24,3
	32	$e \rightarrow \emptyset$	difference, several	27,6
	38	$e \rightarrow [\varepsilon] / \_\_\begin{Bmatrix} vV \\ x(l)V \end{Bmatrix}$	clever, exit	25,2
I	11	$i \rightarrow [ay] / \_\_Ce\#$	fine, like	6,1
	12	$i \rightarrow [ay] / \_\_C\begin{Bmatrix} r \\ l \end{Bmatrix}e\#$	title, idle	25,4
	13	$i \rightarrow [ay] / \_\_CV$	pilot, cider	18,1
	14	$i \rightarrow [ay] / \_\_C\begin{Bmatrix} r \\ l \end{Bmatrix}V$	migrate, idly	25,5
	15	$i \rightarrow [\text{ɪ}] / \_\_C(C)\#$	sit, milk	1,1
	16	$i \rightarrow [\text{ɪ}] / \_\_CC....$	hidden, little	8,2
	17	$i \rightarrow [\text{ə}], [\text{ɪ}]$ in unstressed syllables	missile, office	10,1
	21	$i \rightarrow [\text{ə}] / \_\_\begin{Bmatrix} rC \\ r\# \end{Bmatrix}$	bird, sir	9,1
	22	$i \rightarrow [ay] / \_\_\begin{Bmatrix} nd \\ ld \\ gn \end{Bmatrix}\#$	find, wild, sign	13,3
	24	$i \rightarrow [ay] / \_\_gh$	high, right	19,2
	25	$i \rightarrow [y] / C\_\_VC$	million, onion	23,2
	26	$i \rightarrow [ay] / \_\_\text{-}V$	liar, diet	25,2
	27*	$i \rightarrow [\text{ɪ}] / \_\_C\ ity$	humidity, captivity	24,4
	28*	$i \rightarrow [\text{ɪ}] / \_\_C \begin{Bmatrix} ic \\ id \\ ish \\ it \end{Bmatrix}$	clinic, timid, finish, limit	24,3

Grapheme Unit	Rule #	Rule Description	Examples	Position in sequence
I	32	i → Ø	aspirin	27,6
	35*	i → [i]	police, ski	23,2
	36*	i → [i] /__ -V	radio, period	25,3
	38	i → [ɪ] /__$\begin{Bmatrix} \text{vV} \\ \text{x(l)V} \end{Bmatrix}$	civic, river	24,2
O	11	o → [o] /__Ce#	home, smoke	6,2
	12	o → [o] /__C$\begin{Bmatrix} \text{r} \\ \text{l} \end{Bmatrix}$e#	ogre, noble	25,4
	13	o → [o] /__CV	notice, odor	18,1
	14	o → [o] /__C$\begin{Bmatrix} \text{r} \\ \text{l} \end{Bmatrix}$ V	okra, only	25,5
	15	o → [a] /__C(C)#	lot, lock	1,6
	16	o → [a] /__CC....	motto, hockey	8,2
	17	o → [ə], [ɪ] in unstressed syllables	cotton, sailor	10,1
	21	o → [o], [ɔ], [a] /__r	horn, tortoise	9,1
	22	o → [ə] /w__rC	word, worth	9,3
	23	o → [o] /__lC#	roll, gold, yolk, bolt	13,2
	24	o → [ɔ], [a] /__$\begin{Bmatrix} \text{fC} \\ \text{ng} \\ \text{ss} \\ \text{st} \\ \text{th} \\ \text{g\#} \end{Bmatrix}$	off, soften, song, moss, lost, moth, dog	13,3
	25	o → [o] /__#	go, motto	18,4
	26	o → [o] /__-V	poem	25,2
	28*	o → [a] /__C$\begin{Bmatrix} \text{ic} \\ \text{id} \\ \text{ish} \\ \text{it} \end{Bmatrix}$	phonics, solid, abolish, profit	24,3

Grapheme Unit	Rule #	Rule Description	Examples	Position in sequence
O	31	o → [ə]	won, mother, some, love	13,1
	32	o → Ø	sophomore, licorice	27,6
	38	$o \rightarrow [a] / \_\_\left\{\begin{smallmatrix} vV \\ x(l)V \end{smallmatrix}\right\}$	novel, oxen	24,2
U	11	u → [(y)u] /__Ce#	use, crude	6,2
	12	$u \rightarrow [(y)u] / \_\_C\left\{\begin{smallmatrix} r \\ l \end{smallmatrix}\right\}e\#$	bugle	25,4
	13	u → [(y)u] /__CV	unit, crusade	18,1
	14	$u \rightarrow [(y)u] / \_\_C\left\{\begin{smallmatrix} r \\ l \end{smallmatrix}\right\}V$	bugler	25,5
	15	u → [ə] /__C(C)#	gum, fuss	1,6
	16	u → [ə] /__CC....	sudden, justice	8,2
	17	u → [ə], [ɪ] in unstressed syllables	lettuce, minute	10,1
	20	u → Ø /#g__V	guest, guard	19,6
	21*	u → [ə] /__r	fur, burn	9,1
	26	u → [(y)u] /__-V	fluid, ruin	25,6
	31	u → [ʊ]	bull, push, put	13,1
	32	u → Ø	natural	27,6
Y	11	y → [ay] /__Ce#	rhyme, type	23,3
	12	$y \rightarrow [ay] / \_\_C\left\{\begin{smallmatrix} r \\ l \end{smallmatrix}\right\}e\#$	cycle	25,4
	13	y → [ay] /__CV	tyrant, papyrus	23,3
	14	$y \rightarrow [ay] / \_\_C\left\{\begin{smallmatrix} r \\ l \end{smallmatrix}\right\}V$	cyclone, hydrant	25,5
	15	y → [ɪ] /__C(C)#	myth, gym	23,3

Grapheme Unit	Rule #	Rule Description	Examples	Position in sequence
Y	16	y → [ɪ] /__CC...	system, gypsy	23,3
	17	y → [i], [ɪ] /__# in unstressed syllables	baby, candy	10,2
	19	y → [ay] /__# in stressed syllables	deny, try	3,2
	26*	y → [ay] /__-V	hyena	25,2
	28*	y → [ɪ] /__C $\begin{Bmatrix}\text{ic}\\ \text{id}\\ \text{ish}\\ \text{it}\end{Bmatrix}$	physic	24,3
	36*	y → [i] /__-V	Tokyo	25,3

Spelling-to-sound correspondences for secondary vowels

AI	10	ai → [e]	stain, rain	16,1
	17	ai → [ə], [ɪ] in unstressed syllables	captain, villain	26,3
AU	10	au → [ɔ]	cause, author	16,4
AW	10	aw → [ɔ]	saw, hawk	16,4
AY	10	ay → [e]	day, play	12,1
EA	11	ea → [i]	each, heat	12,2
	31	ea → [ɛ]	bread, deaf, heaven	12,2
	33	ea → [ə] /__r	earn, search	26,4
EE	10	ee → [i]	beet, feel	3,1
EI	10	ei → [i]	receive, ceiling	26,5
	20	ei → [e] /__ $\begin{Bmatrix}\text{gn}\\ \text{n}\\ \text{gh}\end{Bmatrix}$	reign, rein, neighbor	26,6

Grapheme Unit	Rule #	Rule Description	Examples	Position in sequence
EW	10	ew → [(y)u]	few, new	16,6
EY	10	ey → [e]	they, obey	26,6
	17	ey → [i] in unstressed syllables	donkey, money	26,2
IE	11	ie → [ay] /__#	die, lie	19,2
	12	ie → [i] /__....	field, grief	26,5
	17	ie → [i] /__# in unstressed syllables	collie, movie	26,2
OA	10	oa → [o]	load, boat	16,3
OE	10	oe → [o] /__#	hoe, toe	16,3
OI	10	oi → [oy]	noise, join	16,5
OO	11	oo → [u]	broom, tool	12,3
	12	oo → [ʊ]	book, wood	12,3
OU	10	ou → [aw]	count, moutain	16,2
	31	ou → [ə]	couple, young	26,7
	33	ou → [(y)u]	through, group	26,7
	34	ou → [ɔ]	fought, thought	26,7
	35	ou → [o]	soul, though	26,7
OW	11	ow → [o]	glow, below, own, bow	12,4
	12	ow → [aw]	now, allow, owl, bow	12,4
OY	10	oy → [oy]	boy, toy	16,5
UE	10	ue → [(y)u]	blue, argue	16,6
UI	10	ui → [(y)u]	fruit, juice	16,6
	31	ui → [ɪ]	build, biscuit	26,8

Spelling-to-sound correspondences for consonants

Grapheme Unit	Rule #	Rule Description	Examples	Position in sequence
B	10	$b \rightarrow [b]$	boy, cub, number	1,5
	20	$b \rightarrow \emptyset\ /m\_\_\#$	climb, comb	19,4
BB	10	$bb \rightarrow [b]$	bubble, blubber	1,5 (9,2)[11]
C	11	$c \rightarrow [s]\ /\_\_\begin{Bmatrix} e \\ i \\ y \end{Bmatrix}$	city, lace, fancy	7,1
	12	$c \rightarrow [k]\ /\_\_\begin{Bmatrix} a \\ o \\ u \\ C \\ \# \end{Bmatrix}$	cat, come, cut, cream, picnic, scare	4,2
CC	11*	$cc \rightarrow [ks]\ /\_\_\begin{Bmatrix} e \\ i \\ y \end{Bmatrix}$	accent, succeed	20,4
	12	$cc \rightarrow [k]\ /\_\_\begin{Bmatrix} a \\ o \\ u \end{Bmatrix}$	yucca, account, accuse	11,5
CH	10	$ch \rightarrow [\check{c}]$	cheap, church	11,2
	31	$ch \rightarrow [k]$	ache, school, chord, Christ	20,2
CK	10	$ck \rightarrow [k]$	kick, pack	4,2
D	10	$d \rightarrow [d]$	dead, needle	1,4
DD	10	$dd \rightarrow [d]$	hidden, sudden	1,4
F	10	$f \rightarrow [f]$	fat, after	4,1
FF	10	$ff \rightarrow [f]$	off, taffy	4,1

---

[11] The unit in parentheses after some double consonant rules indicates the first actual occurrence.

Grapheme Unit	Rule #	Rule Description	Examples	Position in sequence
G	11	$g \rightarrow [\check{j}] / \_\_ \begin{Bmatrix} e \\ i \\ y \end{Bmatrix}$	gem, age, gin, gypsy	7,1
	12	$g \rightarrow [g] / \_\_ \begin{Bmatrix} a \\ o \\ u \\ C \\ \# \end{Bmatrix}$	gave, go, gum, green, bag	4,3
	20*	$g \rightarrow \emptyset / \begin{Bmatrix} \#\_\_n \\ \_\_n\# \end{Bmatrix}$	gnaw, sign	19,3
	31	$g \rightarrow [g]$	get, girl	11,6
GG	10	$gg \rightarrow [g]$	egg, wiggle	11,5
GH	10	$gh \rightarrow \emptyset$	though, taught, high	19,2
H	10	$h \rightarrow [h]$	home, ahead	1,6
	20	$h \rightarrow \emptyset$	rajah, hour	19,2
J	10	$j \rightarrow [\check{j}]$	joy, judge	4,4
K	10	$k \rightarrow [k]$	milk, kill	4,1
	20	$k \rightarrow \emptyset / \#\_\_n$	know, knot	19,3
L	10	$l \rightarrow [l]$	like, mile	1,3
	20	$l \rightarrow \emptyset / \begin{Bmatrix} o\_\_k \\ a\_\_f \\ a\_\_k \\ a\_\_m \\ a\_\_v \end{Bmatrix}$	yolk, folk, half, calf, walk, stalk, palm, calm, calves, salve	19,5
LE	22	$le \rightarrow [əl] / C\_\_\#$	little, stable	10,2
LL	10	$ll \rightarrow [l]$	bullet, fill	1,3
M	10	$m \rightarrow [m]$	man, came	1,5
MM	10	$mm \rightarrow [m]$	summer, mammal	1,5 (9,2)
N	10	$n \rightarrow [n]$	no, nine, fun	1,1

Grapheme Unit	Rule #	Rule Description	Examples	Position in sequence
N	20	$n \rightarrow [\text{ŋ}] / \_\_ \left\{ \begin{array}{c} x \\ k \\ qu \\ g \text{ pronounced } [g] \\ c \text{ pronounced } [k] \end{array} \right\}$	anxious, thank, sink, banquet, single, fungus, finger, Lincoln	4,1
NG	10	$ng \rightarrow [\text{ŋ}] / \_\_\#$	ring, song	5,5
NN	10	$nn \rightarrow [n]$	inner, funny	1,1
P	10	$p \rightarrow [p]$	people, pop	1,2
PP	10	$pp \rightarrow [p]$	pepper, apple	1,2 (9,2)
PH	10	$ph \rightarrow [f]$	phone, photo	20,2
QU	10	$qu \rightarrow [kw]$	quick, banquet	11,4
R	10	$r \rightarrow [r]$	run, far	1,6
RR	10	$rr \rightarrow [r]$	hurry, marriage	1,6 (9,1)
S	10	$s \rightarrow [s]$	sun, fast, horse	1,3
	20	$s \rightarrow [z] / V\_\_V$	nose, easy	18,2
	21	$s \rightarrow [s] / \left\{ \begin{array}{c} ou \\ oo \\ ea \\ a \end{array} \right\} \_\_e$	house, moose, lease, case	18,2
	31	$s \rightarrow [z] / \_\_\#$	trousers, wives, riches	---[12]
SH	10	$sh \rightarrow [\check{s}]$	shoe, rush	2,1
SS	10	$ss \rightarrow [s]$	mess, missle	1,3

---

[12] Not explicitly taught as a correspondence rule.

Grapheme Unit	Rule #	Rule Description	Examples	Position in sequence
T	10	t → [t]	title, let	2,1
	20	$t \rightarrow \text{Ø} / \left\{\begin{array}{l} s\_\_le\# \\ s\_\_en\# \\ f\_\_en \end{array}\right\}$	wrestle, fasten, often	19,5
TCH	10	tch → [č]	match, notch	11,2
TH	11	th → [θ]	thin, bath	2,2
	12	$th \rightarrow [ð] / \_\_ \left\{\begin{array}{l} e \\ er \\ ern \end{array}\right\} \#$	bathe, father, northern	20,3
	13	th → [ð] in pronouns, conjunctions, and function words.	they, although, the	2,1
TT	10	tt → [t]	little, mitt	1,1 (9,2)
V	10	v → [v]	vase, love	4,5
W	10	w → [w]	wet, beware	4,1
	20	w → Ø /#__r	wren, wrong	19,3
WH	10	wh → [hw] or [w]	when, whether	11,2
X	10	x → [ks]	box, oxen	4,4
Y	10	y → [y]	yet, beyond	4,4
Z	10	z → [z]	zoo, lazy	4,5
ZZ	10	zz → [z]	buzz, fuzzy	4,5 (10,1)

APPENDIX E

Number of Words Sequenced for Reading Instruction

Year	Basic word list (Section II)	Irregularly-spelled words (Section III)	Proper names (Section IV)	Irregularly-spelled proper names (Section IV)	Total
1	796	35	65	---	896
2	2286	110	159	---	2568
3	3210	615	95	37	3960
4	1130	384	103	28	1644
Total	7422	1142	422	65	9066
Additional unsequenced material (Section V)					248
Grand total					9311

Total number of names: 487

Total number of other words: 8824
(This is approximately 1% less than the total number of words in the lexicon as reported in Berdiansky, Cronnell, and Koehler, 1969. This small difference may be due to (1) human error in compiling lists and frequencies, and (2) correction of errors in the lexicon. A number of additions are found in the Errata and Addenda of the present volume.)

REFERENCES

Berdiansky, Betty, Cronnell, B., & Koehler, J., Jr. Spelling-sound relations and primary form-class descriptions for speech-comprehension vocabularies of 6-9 year-olds. Technical Report No. 15, 1969, Southwest Regional Laboratory, Inglewood, California.

Cronnell, B. Annotated spelling-to-sound correspondence rules. Technical Note No. TN-2-71-32, Southwest Regional Laboratory, Inglewood, California.

Cronnell, B. Proper names for use in beginning reading. Research Memorandum, 1969, Southwest Regional Laboratory, Inglewood, California. (a)

Cronnell, B. Selection and teaching of sight words in beginning reading instruction. Research Memorandum, 1969, Southwest Regional Laboratory, Inglewood, California. (b)

Desberg, P., & Cronnell, B. An instructional sequence for spelling-to-sound correspondences for the one- and two-syllable words in vocabularies of 6-9 year-olds. Technical Report No. 16, 1969, Southwest Regional Laboratory, Inglewood, California.

Webster's new world dictionary. Cleveland: World Publishing Company, 1957.

SWRL

SOUTHWEST REGIONAL LABORATORY
TECHNICAL MEMORANDUM

DATE June 4, 1971

NO: TM-2-71-03 Volume II

DESIGN FOR SEQUENCING SPELLING-TO-SOUND CORRESPONDENCES IN MOD 2 READING PROGRAM

Betty Berdiansky, George Stanton, and Bruce Cronnell

ABSTRACT

From a 9000-word lexicon, a set of spelling-to-sound correspondence rules was developed to systematically organize instruction for beginning reading. With the aid of computer sorting procedures, rules and rule exemplars were sequenced according to criteria of productivity, regularity, generalizability, and phonological equivalence.

This report is in two volumes: Volume I describes sequencing criteria and methodology, and the specific rule sequence; Volume II lists all words (including irregularly-spelled words and proper names), sequenced by and within rules.

This document is intended for internal staff distribution and use. Permission to reprint or quote from this working document, wholly or in part, should be obtained from SWRL, 11300 La Cienega Boulevard, Inglewood, California, 90304.

TABLE OF CONTENTS

Introduction 3

Section I Criteria for within-rule sequencing 5

Section II Sequenced word lists 26
- First-year word list (Blocks 1-4) 26
- Second-year word list (Blocks 5-14) 40
- Third-year word list (Blocks 15-22) 82
- Fourth-year word list (Blocks 23-27) 132

Section III Sequenced irregularly-spelled words 157
- Recommended order of instruction for irregularly-spelled words in first year 158
- Recommended order of instruction for irregularly-spelled words in second year 160
- Recommended order of instruction for irregularly-spelled words in third year 165
- Recommended order of instruction for irregularly-spelled words in fourth year 179

Section IV Sequenced proper names 189
- Sequenced proper names for first year 190
- Sequenced proper names for second year 192
- Sequenced proper names for third year 195
- Sequenced proper names for fourth year 197
- Sequenced irregularly-spelled proper names 197

Section V Additional unsequenced words 203

Errata and Addenda 209

Appendices
- A. Key to pronunciation and symbols 213
- B. Glossary 216
- C. Summary of rule sequence 218
- D. Spelling-to-sound correspondences: Rule descriptions, exemplars, position in sequence 227
- E. Number of words sequenced for reading instruction 238

References 239

Volume II

Introduction 3

Section I Criteria for within-rule sequencing 5

Section II Sequenced word lists 26
- First-year word list (Blocks 1-4) 26
- Second-year word list (Blocks 5-14) 40
- Third-year word list (Blocks 15-22) 82
- Fourth-year word list (Blocks 23-27) 132

Section III Sequenced irregularly-spelled words 157
- Recommended order of instruction for irregularly-spelled words in first year 158
- Recommended order of instruction for irregularly-spelled words in second year 160
- Recommended order of instruction for irregularly-spelled words in third year 165
- Recommended order of instruction for irregularly-spelled words in fourth year 179

Section IV Sequenced proper names 189
- Sequenced proper names for first year 190
- Sequenced proper names for second year 192
- Sequenced proper names for third year 195
- Sequenced proper names for fourth year 197
- Sequenced irregularly-spelled proper names 197

Section V Additional unsequenced words 203

Errata and Addenda 209

Appendices
- A. Key to pronunciation and symbols 213
- B. Glossary 216
- C. Summary of rule sequence 218
- D. Spelling-to-sound correspondences: Rule descriptions, exemplars, position in sequence 227
- E. Number of words sequenced for reading instruction 238

References 239

Introduction

The Model 2 Communication Skills Program of the Southwest Regional Laboratory for Educational Research and Development includes a phonics-based reading program founded on a set of spelling-to-sound correspondence rules. The decision to use correspondence rules in teaching the skill of decoding printed words was based principally on the fact that spelling-sound patterns of English words are generally regular and specifiable by means of a manageable number of rules (Venezky, 1967, 1970). Since the regularities of English spelling-to-sound patterns far outnumber the irregularities, a rule-based phonics approach is more likely to provide positively transferable elements in decoding new words than a nonphonics approach, and the few irregularities can be learned as sight words. For a detailed discussion of the merits of a phonics approach, and the use of rules of correspondence in such a reading program, see Desberg and Berdiansky (1968) and Berdiansky, Cronnell, and Koehler (1969).

Identification of the Lexicon

The first step in the design of this reading program was the specification of a lexicon appropriate for children at the kindergarten through third-grade level. Twenty-nine different sources were consulted in this regard, including the Rinsland (1945) list for elementary school children, published preprimer to fourth grade reading materials, published word lists, children's responses to word association tasks, children's TV programs, children's verbal behavior in song and in play, and special interest materials (e.g., clock time information). Approximately 9000 words were selected which were believed to be in the recognition, if not active, vocabulary of K-3 children. This provided an adequate base for studying the spelling-to-sound correspondences needed in beginning reading, as well as an ample supply of words for actual use in the reading program. All words not already categorized by the Rinsland list were screened and edited by the SWRL staff, and categorized as appropriate to either the 6-7 or 8-9 year-old age group (equivalent to K-1 and 2-3 grade levels, respectively).

Development of Spelling-to-Sound Correspondence Rules

After specification of the lexicon, the spelling-to-sound correspondence rules were developed--based primarily on the work of Venezky (1967, 1970). Venezky's rules were modified somewhat to enable the reader to proceed directly from a graphemic to a phonemic representation of the spelling patterns specified by any given rule.[1] Moreover, the study of spelling-to-sound correspondences was limited to the 6000 one- and two-syllable words in the SWRL lexicon, since these were believed to be easier and more useful than polysyllabic words for beginning readers.

Although there are only 26 letters in the alphabet, a total of 69 grapheme units were identified for the lexicon. This larger number is due to the fact that grapheme units were considered to be not only single consonants and vowels (e.g., *m*, *e*) but also sequences of letters which act as a unit:

1. double consonants, e.g., *mm*, *tt*;

---

[1] See Berdiansky *et al*. (1969) for greater detail regarding the development of the correspondence rules, as well as the lexicon specification.

2. consonant digraphs, e.g., two consonant letters, the pronunciation of which cannot be determined from the correspondences for the individual letters, e.g., ch, th;
3. strings of letters which commonly function together as units, e.g., ck, le;
4. secondary vowels, i.e., two or more vowel letters with a single corresponding pronunciation, e.g., au, ea.

A total of 166 correspondences were established for the one- and two-syllable words in the lexicon. (A list of all correspondences, with examples, is found in Appendix C. See Berdiansky et al., 1969, Section III, and Cronnell, 1971, for a complete description of the correspondences used in this project.) However, for nearly two-thirds (42) of the 69 grapheme units one correspondence rule was sufficient; for 15 of the grapheme units, only two rules were needed; for the remainder, 7 required from 3-5 rules. It was the primary vowels (a, e, i, o, u, y), with 11-16 correspondence rules apiece, that appreciably raised the total number of rules established for the lexicon. This latter result is not very surprising considering the well-known variability of English vowel spellings.

The large number of correspondences may imply an unwarranted degree of complexity. The following four points should clarify this issue.

1. Many correspondences are generalizable across several grapheme units (e.g., correspondences for final VCe); this is particularly true for primary vowels where there are ten such cases; i.e., there are 50 individual letter correspondence rules which can be reduced to ten general vowel correspondences (referred to

as "general primary vowel rules").

2. Correspondences which were general but complex (e.g., $\underline{o} \rightarrow [o]$ $/\_\_C(\left\{\begin{matrix} r \\ l \end{matrix}\right\})V$) were broken down into several simpler ones (e.g., Rules 011, 012, 013, 014[2]). This simplification, while reducing complexity, did increase the number of correspondences.
3. Correspondences were established for each double consonant, although, in all instances but two, the pronunciation is the same as for the single consonant.
4. While the environmental conditions differ for each correspondence for a particular grapheme unit, the number of different pronunciations involved is relatively small. After allowing from one to six single-word pronunciation irregularities per grapheme unit, 35 of the grapheme units have just one pronunciation and 17 have just two (see Appendix H).

Thus, the larger number of correspondences does not necessarily indicate a proportionately greater amount of learning difficulty.

With the set of correspondences appropriate to the lexicon established, the 6000 one- and two-syllable words were coded for their component grapheme unit correspondences (as well as for other information such as stress). These coded words were then processed by computer and grouped by correspondences, so each word appeared in the list of exemplars of each of its component correspondences (e.g., the word in, coded 115,N10, is included in the printout both for Rule 115 and N10). Using the computer-generated data, counts were made of the frequency of individual correspondences (e.g., the frequency of 115 = 502 which means that Rule 115 occurs in 502 words). These frequency counts provided information on the usefulness of correspondences and were employed in the sequencing of correspondences.

---

[2] An explanation of the numbering system devised for the rules of correspondence is given in Berdiansky *et al*. (1969, p. 13).

Statement of Task

In order to use spelling-to-sound correspondences in an instructional program, they must first be sequenced. Therefore, after the compilation of the lexicon and the specification of the spelling-to-sound correspondence rules, the subsequent task in the development of the reading program was the formulation of an instructionally efficient and practical rule sequence.

The major criteria for the fulfillment of this task were as follows:

1. The spelling-to-sound correspondence rules were to be sequenced primarily according to frequency of occurrence in the SWRL lexicon. High-frequency correspondences are more useful because they provide more word exemplars and greater opportunity for transfer.
2. The sequence of reading instruction was to begin with simple regular rules. Complex rules and rules with pronunciation variations were to be introduced later. More specifically:
   a. correspondences for single letters would precede correspondences for grapheme units of two or more letters;
   b. grapheme units with only one correspondence would precede those with two or more;

   c. correspondences with no environmental constraints would precede those with environmental constraints;
   d. geminate consonant rules (e.g., MM10) would be sequenced with their corresponding single consonant rules (e.g., M10).
3. Rules were placed earlier in the sequence if they occurred in words which individually had high speech frequencies. Thus, when combined with rules having high, total lexicon frequencies, a small number of rules would be able to generate a large number of frequently-used words.
4. The rules were to be sequenced so that, from the beginning of the program, syntax approximating that of normal speech would be possible by using primarily those words containing rules already taught. The number of sight words necessary for this natural syntax was to be minimal.

Program Implications and Advantages

A beginning reading program employing such a sequence of rules and words has the following major implications and advantages:

1. A well-organized set of phonics rules enables the reader to identify many words which are in his vocabulary, but which he has not encountered before in print.
2. The rules, defined on a properly delimited set of lexicon items, are sequenced in a manner that capitalizes on their applicability to the vocabulary of the typical reader.
3. Emphasis is placed on the regularity of the English letter-sound correspondence system and the high degree of pronunciation

predictability. Instruction also specifically points out those words containing a correspondence which is not predictable.

4. The most productive and most useful rules are introduced early. Thus, many words are initially available upon presentation of few rules.
5. Instruction is simplified by focusing on individual correspondence rules. Extensive practice is made available for each new rule by means of words containing that rule as their only novel component.
6. Environments are presented as pronunciation determiners for the many rules for which such is the case. Knowledge of rule environments thus becomes particularly valuable for decoding words not previously encountered in print.
7. Systematic simple-to-complex instruction follows from the sequence.
8. The large number of words permits construction of equivalent, but not identical, word usage in practice materials, reading text, word-attack exercises, and criterion-attainment checks.
9. Grouping words according to common correspondence components provides numerous examples for instruction focusing on a rule, whether or not that rule is made explicit to the reader. The degree to which the rule will be used for the generation of specific instructional cues has yet to be decided.
10. Correspondences can be put to use immediately. They are not isolated bits of information which must be memorized in a content-free context.

11. The large pool of available words is classified according to an instructionally practical, accurately detailed system of spelling-to-sound correspondence rules. Such specificity provides a basis for accurately decoding words by applying rules to the pronunciation of words containing those rules.

The sequence which will now be described and discussed is the product of numerous and extensive critical analyses and revisions, and is considered sufficiently refined to warrant a moderately large-scale tryout of a prototype product employing this sequence.

Section I

General Sequencing Criteria and Methodology

Development of Rule Sequence for Block I

Desberg and Cronnell (1969) presented a preliminary sequence reflecting the criteria given under "Statement of Task" (pp. 6-7) with primary emphasis on productivity of each rule within the entire lexicon. However, in their report, the primary vowels, secondary vowels, and consonants were sequenced separately. For the reading program, the vowels and consonants had to be combined to produce exemplars, so Desberg and Cronnell's preliminary sequence was revised. The most productive vowel and consonant rules in that sequence were chosen as the content of Block I. (The rationale for other Block and Unit divisions will be discussed below). These rules were combined, and a listing was made of the number of words containing only those rules. This information enabled the rules to be ordered on the basis of productivity within this more restricted lexicon.

The Rules A15, I15, and E15 (a → [æ], i → [ɪ], e → [ɛ]) were the most productive primary vowel rules. Therefore, a count was made of the number of words which could be formed by combining each of those vowels with the 9 most productive consonants to form every possible 2-, 3-, or 4-letter combination.[3] (Given these constraints, five-letter combinations were not considered since they were relatively infrequent). This count yielded a ranking of productivity of the various rule combinations. The four rules which constituted the most productive combination were chosen for Unit 1 of Block I. Four rules were required to produce 10 words, but this seemed to be a manageable learning load.

---

[3] For a more detailed step-by-step description of the sequencing of the rules in Block I, see Appendix E.

For the rest of Block I, the remaining rules were sequenced by comparing the number of words introduced after combining each rule with those rules already introduced. Each new rule was sequenced at the point where, of all the remaining rules, that rule made the greatest increase in the number of words introduced.

General Sequencing Criteria

In order to determine a sequence for the rules beyond Block I, two general criteria were employed: productivity and complexity. The relatively more productive and less complex rules were sequenced first. Productivity was determined by:

1. number of words in the lexicon containing that rule;
2. usage frequency of the words in the lexicon containing that rule.

Complexity was less concisely definable. The following were the principal determiners of relative rule complexity.

1. Grapheme-unit pronunciation variability. How many other pronunciations does this rule's grapheme unit have? The more pronunciations associated with the grapheme unit, the more complex are any of its correspondence rules (e.g., c with 4 possible pronunciations: [s], [k], [č], and [š] is considered to have more complex rules than b, which has only 2 possible pronunciations: [b] and [ø]).

2. Environment complexity. To determine the pronunciation of a grapheme unit in a particular exemplar, how much must be known about the surrounding letters or about the grapheme unit's position within the exemplar (i.e., is it at the beginning, middle, or end of the word?). The more letter-specific the environment must be to determine the pronunciation, the more complex the rule (e.g., Rule A23: $\underline{a} \rightarrow [\text{ɔ}] / \_\_ \begin{Bmatrix} ll \\ lk \\ lt \\ ld \end{Bmatrix}$ is considered more complex than Rule A15: $\underline{a} \rightarrow [\text{æ}] / \_\_C(C)\#$).

3. Environment similarity. How similar is the rule's environment to the environments of other rules (with different pronunciations) for the same grapheme? A rule is relatively complex if it involves the same environment as another rule specifying a different pronunciation for the same grapheme. For example, the Rules 0011 and 0012 are complex in this regard since 0011 ($\underline{oo} \rightarrow [u]$) shares many environments with 0012 ($\underline{oo} \rightarrow [\text{ʊ}]$), so those environments cannot specify the correct pronunciation.

4. Environment generalizability across grapheme units. Does a specific type of environmental constraint apply to more than one grapheme unit? If, for example, a vowel rule involves the same environment recently learned for a different vowel, then that rule is considered less difficult to learn than if it had a unique environment (e.g., general primary vowel Rule 11).

5. Functional similarity of the environment. Does the rule expand an environment already learned for the same grapheme-phoneme correspondence? For example, general primary vowel

Rules 12, 13, and 14 ($V \rightarrow [\bar{V}]\ /\_\_C\{^{r}_{l}\}e\#$, $/\_\_CV$, $/\_\_C\{^{r}_{l}\}V$) are considered less complex in this regard if taught after instruction on general primary vowel Rule 11 ($V \rightarrow [\bar{V}]\ /\_\_Ce\#$), of which they are extensions or expansions.

6. Phonological generalizability. Does the rule specify the same pronunciation as a rule for a different grapheme? For example, Rules K10, C12, and CK10 all have a [k] pronunciation. These correspondences should be easier to remember if the rules are sequenced together. Also, unstressed vowels often share a common [ə] or [ɪ] pronunciation, and so are sequenced together.
7. Similarity of exemplars to those already introduced. Do the words containing the rule have the same number of syllables or the same stress pattern as words previously allowed by the sequence?

Rationale for Unit, Block, and Year Divisions

To enhance its use for developing an instructional program, the initial rule sequence was divided into groups called Blocks, and then into Units within Blocks. The blocks and units were sequenced, as were the correspondences within them. This division reflected the grouping of rules according to specific similarities so that instruction could conveniently focus on limited shared characteristics of the rule exemplars at any point in the sequence. Such a focus was expected to promote the learning of rule generalizations which could be applied to transfer (i.e., previously unencountered) words.

Some of the criteria for grouping correspondences into units and blocks were as follows:

1. type of grapheme unit (e.g., primary vowels vs. secondary vowels);
2. generalizability across correspondences (e.g., the vowel classifications VCe, VCC, Vr, schwa);
3. rule frequency;
4. single letters vs. digraphs;
5. phonological similarity or identity (e.g., the [ð] and [θ] correspondences for th; the [oi] correspondence for oi and oy);
6. environmental similarity (e.g., correspondences for a and o before l).

In addition, provisions were made in the sequence for introducing words of two, three, or four syllables at successive points. The general steps involved in sequencing words of more than one syllable were as follows (with two-syllable words as examples):

1. compounds (e.g., bedtime),
2. affixed forms (e.g., bigger),
3. words arranged by stress pattern (e.g., first syllable stressed: rabbit; second syllable stressed: until).

The 27 blocks varied greatly in the number of new rules introduced in each. The number ranged from zero, in blocks concerned with affixes or the review of previously introduced rules for polysyllabic words and higher age-level words, to a high of 24 rules in Block I.

The 27 blocks were grouped into four instructional year divisions. The divisions were based on manageable learning loads for the corresponding Kindergarten through Third Grades, rather than on equally dividing the number of blocks or rules per year. (First Year: 4 blocks, 44 rules; Second Year: 10 blocks, 48 rules + suffixes and -VCCe exemplars;

Third Year: 8 blocks, 35 rules, plus affixes, "8-9 age level" words, and three-syllable words; Fourth Year: 5 blocks, 57 rules, plus affixes and four-syllable words.)

The resulting sequence of rule categories, by year, was:

1. First Year involves short vowels, single consonants, geminate consonants (e.g., _nn_, _tt_), and consonant digraphs (e.g., _sh_, _th_). All of the exemplars are one-syllable, one-vowel words. And instruction covers at least one pronunciation, the most frequent in the SWRL lexicon, for all letters of the alphabet (except _q_). The consonant digraphs sequenced in First Year are common digraphs contained in high-frequency words. The short-vowel rules are introduced before the long-vowel rules because the short vowels are more frequent, and have simpler environments, in that their one-syllable exemplars each contain only one vowel, with that vowel always pronounced. The consonant, digraph, and other vowel rules specified for first-year instruction are generally of high frequency and/or relatively low complexity.
2. Second Year introduces long vowels, other high-frequency primary vowel rules, secondary vowels, and additional consonant digraphs. Two-syllable words, commencing with compounds and inflectional endings, enter the sequence in Second Year, and instruction covers the vowel stress pattern variation of these two-syllable words. The primary vowel rules involved in Second Year, besides the long-vowel -VCe rules, are the correspondences for vowels preceding _r_, short vowels in two-syllable words (-VCC...), and

unstressed vowels having an [ə] or [ɪ] pronunciation. In addition, there are six alternate vowel pronunciation rules introduced which account for high-frequency words considered to be exceptions to the regular short- and long-vowel rules. The secondary vowels entering the sequence here are of high frequency.

3. In Third Year, 8-9 age-level words, as well as 6-7 age-level words, are utilized as exemplars for the rules introduced. The sequence includes the following: three-syllable words; medium-frequency primary and secondary vowel rules; low-frequency consonant rules; silent letters; two- and three-syllable words with affixes; major palatalizations; and stress patterns for three-syllable words.
4. The Fourth Year sequence covers the remainder of the rules of correspondence, i.e., primary and secondary vowel rules of low frequency and low utility. In addition, four-syllable words are introduced, including those with affixes and those with new stress patterns.

Computer Processing of Sequence, Rules, and Exemplars

After establishing a sequence for the rules of correspondence, a computer program was written applying the sequence to the entire lexicon of one- and two-syllable words.[4] This program was designed to search the lexicon and to list for each rule the words containing that rule in combination with rules previously introduced. Each word appeared as an exemplar of only one correspondence, all other correspondences in the word having already been introduced. In addition to the main purpose of listing sequenced rule exemplars, the computer program also provided a count of the number of words listed upon the introduction of each rule, the number of words listed for each unit of rules, and the number of words listed for each Block of rules. The word lists and frequency counts are given in Volume II, Section II. The program was run separately for the portion of the lexicon designated as appropriate for the 6-7 year-old age group, and again for the 8-9 age-group portion. See Appendices F and G for detailed descriptions of the computer programs for the rule sequence.

---

[4] The authors wish to express their appreciation to Richard Anguilly, who wrote the program and executed the computer processing.

In addition to the computer-processed sequence, the uncoded words of three or more syllables were arranged in the sequence by hand. Upon the addition of these words, several more correspondences were established to account for additional spelling-to-sound relations found in the larger lexicon; this brought the total number of sequenced correspondences from 166 to 186.

Also, a parallel study (Cronnell, 1969) was made of spelling-to-sound correspondences in nearly 500 common proper names (primarily first names, but with some high-frequency surnames). These names (both regular and exceptions) were arranged according to the sequence and principles described above. Volume II, Section IV lists these sequenced proper names.

Within-Rule Sequencing Criteria

Examination of the computer listing of exemplars for each rule in the sequence revealed that certain words were simpler and clearer examples of the rule than were other words in the same list. Consequently, the exemplars of each rule were subgrouped, primarily according to the location of the exemplified grapheme unit in those exemplars. Then an instructional word-group order was established, based on predicted efficiency and clarity of rule exemplification in each word group. The general criteria used for this order, which is basically the same for vowel, consonant, and digraph rules, are:

1. Position of grapheme unit: initial, final, medial, in that order of difficulty;
2. Number of syllables: more syllables mean greater difficulty;
3. Frequency: a more frequent environment offers more exemplars for presentation;
4. Where applicable, rule exemplars, within a section were further subgrouped in the following order of descending preference:
    a. exemplars containing single consonants,
    b. exemplars containing geminate consonants,
    c. exemplars containing consonant digraphs,
    d. exemplars containing consonant clusters;
5. Where applicable, rule exemplars within a section were also further subgrouped in the following order of descending preference:
    a. exemplars containing short vowels,
    b. exemplars containing ee,
    c. exemplars containing long vowels,

d. exemplars containing secondard vowels;

6. The pronunciation of the vowel(s) in an exemplar will be somewhat affected by the consonant it precedes if that consonant is r, l, or a nasal (n, m, ng).

When there was no criterion for division, or when the number of exemplars was low, words were alphabetized. Within each subgroup, words were also alphabetized.

Volume II, Section II lists the exemplars for each rule, subgrouped according to the within-rule sequencing criteria described. More specific criteria also utilized are discussed in Volume II, Section I.

Irregular Words

Approximately 10 percent of the one- and two-syllable words in the SWRL lexicon are labeled "irregular" (numbered as a Rule 40). These words contain at least one pronunciation or environment which is not accounted for by any of the rules in the program. Such exceptions were grouped and listed separately from the regular words, but according to the same sequence described above for the regularly-spelled words. For the purpose of computer sequence processing, the irregular rule(s) within each exception word was designated as equivalent to its earliest appearing regular counterpart (e.g., A40 = A15). In addition, each word was not introduced until all the regular correspondences within it had appeared in the sequence. Thus, the irregular words were computer sequenced according to their earliest possible occurrence. In general, it was planned that irregular words would enter the exemplar sequence with the rules to which they were similar; or to which they were specific exceptions, provided that all of their regular rule components had already been introduced. To accomplish this, some of the irregular words had to be "hand-moved" in the sequence.

It is recognized, of course, that many exceptions are high-frequency function words, useful and necessary for reading text syntax, and which for naturalness in reading materials must be used earlier than now placed in the sequence. In fact, a reading program could well begin with 15-20 high-frequency and high-utility sight words (primarily irregular), rather than commencing immediately with rule-based words, in order to more closely approximate spoken language in the reading texts. Most irregular words contain only one irregular correspondence. (While 10 percent of the coded one- and two-syllable words in the lexicon are irregular, their irregular components account for only 3 percent of the total number of graphemes used in the lexicon.) This being the case, after rules are introduced, reinforcement can still be given the reader for decoding the major part of an irregular word, thus again emphasizing the high degree of regularity in English spelling-to-sound correspondences.

Some exceptions can be handled by additonal correspondences when a larger lexicon is used. Moreover, even when there are exceptions to established correspondences (primarily due to environmental constraints), new or unusual pronunciations for a grapheme unit are rarely involved. In addition, only 55 different base words plus their derived forms (e.g., to, plus into, onto, and unto) account for 21 percent of the exception words. If beginning readers can learn a group of basic sight words and can have a set for diversity, they should be able to decode most words containing exceptions.

Consideration should also be given to allowing contractions, abbreviations, and bound morphemes early in a reading program. Without these, sentences often tend to be awkward and unnatural. For example, using the words *let us* both when meaning "allow us" and for the imperative "let's" is not only awkward but confusing. If contractions, such as *isn't*, *won't*, and *didn't* are not allowed, then questions involving their full forms will always have to be asked in the positive form (e.g., Is he going to the store?), even when the negative form might be more appropriate from the context (presumably one is not going to write "Is he not going...?"). The use of common contractions might also decrease the length of time beginning readers read in a stilted, word-by-word fashion, since such contractions would make the texts more like spoken language.

High-frequency abbreviations such as *Mr.* and *Mrs.*, and others such as *Dr.*, *St.*, *Ave.*, *a.m.*, and *p.m.* might also be considered for inclusion, commencing at least in the second year of instruction. See Cronnell (1970) for a description and sequencing of contractions and abbreviations.

Narration may change tense unnaturally within beginning stories if constraints are placed on the scripting by the absence of bound morphemes, such as -*s*, -*es*, (plurals and third-person singular), -*ing* (continuous present tense and the "going to" future) and -*ed* (past tense) endings. There tends to be a lack of consistency both within the narration itself and between the narration, dialogue, and illustrations. Also, the choice of tenses can easily result in being based on the text vocabulary available rather than on natural use. Thus, for instance, it is possible that the regularly-spelled, but irregular tense form, ran would be allowed but not the regular base plus -ed, jumped. And for the sentence, "Look at Dan; he's jumping on the bed," the storywriter might have to substitute, "Look at Dan; he jumps on the bed," even when the latter has the connotation that Dan does this quite often.

Investigations should be made to determine whether the additional learning loads involved with contractions and such bound morphemes as -s, -ing, and -ed are really great enough in the first year of instruction to warrant sacrificing natural speech and possibly even hindering comprehension and reading fluency.

Grapheme Pronunciation Variability

As discussed above, the SWRL Reading Program incorporates two types of spelling-to-sound rules of correspondence: "regular" rules with predictable pronunciations usually occurring in specifiable environments; and "irregular" rules with correspondences considered too unproductive to be classified as regular rules, or with exceptions to regular rules. An irregular correspondence of this latter type is one with a pronunciation not already covered by a regular rule, or one with a regular pronunciation occurring in an environment different from that specified by the regular rule.

Most consonant and secondary vowel grapheme units have only one or two regular pronunciations. And for all consonants but ng, s, and th, and for all secondary vowels but ie, there is only one regular rule per pronunciation. Primary vowels, however, each have an average of 6 regular pronunciations covered by 13 rules. Consonants and secondary vowels have an average of one or two irregular pronunciations. These irregular correspondences involve pronunciations other than those covered by regular rules, except in a minority of cases where one and occasionally two of the pronunciations are the same as regular rules but occur in different environments. Primary vowels, on the other hand, have an average of 7 irregular pronunciations, one-half of which are the same as those accounted for by regular rules; they are irregular in that they occur in different environments.

Confronted with the large number of correspondence rules (186, although many of the vowel rules could be combined and then generalized across the primary vowels), and faced with the environmental details specified by the rules, the learner might lose sight of the degree to which the most important information to be gained about each grapheme unit--its pronunciation(s)--can be condensed from rule information. Another aspect of this pronunciation overview that the learner might not deduce is that the pronunciation variability is much lower for both consonants and secondary vowels than for primary vowels, and that he will, therefore, have to concentrate more on environment specifications of the primary vowel rules for indications of correct pronunciation than he will for other rules.

In Section I of Appendix H, there is listed for each grapheme unit, all of its possible pronunciations and the rules (or the specific exception words) which cover each of the pronunciations. In Section II of that Appendix, graphemes are grouped according to pronunciation variability. The purpose of grouping graphemes by their degree of pronunciation variability was to determine which graphemes could, instructionally, have just one or two pronunciations associated with them with little or no emphasis on environmental information, and which would require information about the position of the grapheme in that exemplar to determine the pronunciation.

Five categories of pronunciation variability are listed. Beginning with graphemes having invariant pronunciations, the categories are presented in order of increasing grapheme pronunciation variability. Within each category, the order of graphemes is: single consonants, geminate consonants, digraphs, primary vowels, and secondary vowels.

The data indicate that geminate consonants are invariant or very nearly so, with the only exception being *ss*, which has one major pronunciation and two minor ones. Single consonants tend to have a major pronunciation with a few irregular exemplars, or to have a major pronunciation and a secondary pronunciation. The only consonants which could not be fit into this description (by acknowledging automatic selection by the reader of the correct allophones for *d* and *n*, for example) are *c*, *g*, *s*, and *t*. Consonant digraphs have one or sometimes two pronunciations, with the exceptions being *ch* and *ng* (and the latter's pronunciation depends on environment). Secondary vowels have one or two pronunciations, except for *ea* and *ou* which each have more than three common pronunciations. Primary vowels are highly variant, with an average of seven pronunciations.

In all, one-half of the 69 grapheme units used in the rules have just one pronunciation, with the allowance of 1-6 exception words; one-quarter have just two pronunciations, with the allowance of 1-6 exception words; and only the remaining one-quarter have three or more pronunciations.

Section II

Specific Rule Sequence, Criteria, and Comments

Summary of Rule Sequence[5]

First Year

(One-syllable words; Single consonants; Geminate consonants; Digraphs; Short vowels)

Block I (Highest frequency single consonants; Geminate consonants; General primary vowel Rule 15: short vowels)

1,1 N10, NN10, T10, (TT10)[6], A15, I15

1,2 P10, (PP10)

1,3 L10, LL10, S10, SS10

1,4 D10, DD10, E15

1,5 M10, (MM10), B10 (BB10), U15

1,6 R10, (RR10), H10, O15

Block 2 (Consonant digraphs)

2,1 SH10

2,2 TH13, TH11

Block 3 (Geminate vowel; Long vowel at end of word)

3,1 EE10, E25

3,2 Y19

---

[5] See Appendix D for the pronunciation, rule description, and example of each rule.

[6] Block I double consonant rules in parentheses have no exemplars at the point where they are listed in the sequence. Nevertheless, they are included--with their corresponding single consonant rules--because both rules have the same pronunciation. In Appendix C, it is noted where exemplars of the parenthesized rules first appear.

Block 4 (Less frequent consonants)

4,1	F10, FF10, W10
4,2	K10, N20, C12, CK10
4,3	G12
4,4	J10, X10, Y10
4,5	V10, Z10, ZZ10

Second Year

(Two-syllable words; Long-vowels; Vowel-r; Other high-frequency vowel rules; High-frequency digraphs; Unstressed vowels; Common exceptions vowel rules; High-frequency secondary vowels)

Block 5 (Compounds; Suffixes; NG10)

5,1 Compounds using first year rules (first syllable stressed)

5,2 -ing suffix with previously introduced base words

5,3 -es suffix (plurals and third-person singular, present tense forms) of previously introduced base words

5,4 -ed suffix (past tense) of previously introduced base words

5,5 NG10 (one-syllable words)

Block 6 (General primary vowel Rule 11)

6,1 E18, A11, I11

6,2 O11, U11, E11, EE10 + E18

Block 7 (C11, G11; Suffixes with general primary vowel Rule 11)

7,1 C11, G11

7,2 -s, -d, and -ing suffixes added to words with general primary vowel Rule 11.

Block 8 (Two-syllable words, first syllable stressed)

8,1 Compounds with rules in Blocks 5-7

8,2 A16, I16, U16, E16, O16 (two-syllable words, first syllable stressed)

Block 9 (Vowels before r)

9,1 A21, O21, U21, I21, E21 (one-syllable words)

9,2 E21 (plus -er suffix with previously introduced words), U21, I21, A21, O21 (two-syllable words, first syllable stressed)

9,3 A25, O22

Block 10 (Unstressed vowels; Two-syllable words, second syllable stressed)

10,1 I17, E17, A17, O17 (first syllable stressed)

10,2 Y17, LE22

10,3 Compounds (second syllable stressed)

10,4 I16, U16, A16, O16, E21, O21, EE10 (two-syllable words, second syllable stressed)

10,5 A17, E17, O17, U17, I17 (second syllable stressed)

Block 11 (Consonant digraphs; GG10, CC12, G31)

11,1 NG10 (two syllables)

11,2 CH10, TCH10

11,3 WH10

11,4 QU10

11,5 GG10, CC12

11,6 G31

Block 12 (High-frequency secondary vowels)

12,1 AY10

12,2 EA11, EA31

12,3 OO110, OO12

12,4 OW11, OW12

Block 13 (Additional common primary vowel rules)

13,1 O31, U31

13,2 A23, O23

13,3 I22, O24

Block 14 (Nonlong vowels in -VC(C)e words)

14,1 Stressed VCCe#

14,2 Stressed VrCe#

14,3 Unstressed VCCe# and VCe#

Third Year

(8-9 age-level words; Three-syllable words; Medium-frequency primary and secondary vowels; Low-frequency consonants; Silent letters; Major palatalizations; Affixes; Stress patterns)

Block 15 (Review, employing 8-9 words covered by First- and Second-Year rules)

15,1 8-9 one-syllable words with First-Year rules

15,2 8-9 words with Second-Year rules

Block 16 (Secondary vowels of medium frequency)

16,1 AI10

16,2 OU10

16,3 OE10, OA10

16,4 AW10, AU10

16,5 OI10, OY10

16,6 UE10, UI10, EW10

Block 17 (Suffixed and compound three-syllable words; Suffixes)

17,1 Three-syllable compounds

17,2 Two-syllable words with suffixes: -er, -en, -ing, -y, -s, -ed

17,3 Three-syllable words with suffixes: -er, -en, -ing, -ed, -ly

Block 18 (Primary-vowel and single-consonant rules of medium frequency)

18,1 E13, O13, A13, I13, U13

18,2 S20, S21

18,3 A22

18,4 O25

Block 19 (Silent letters)

19,1 Three-syllable words with suffixes: -ment, -or, -ive, -ness, -ance, -ant
19,2 IE11, I24 + GH10, GH10, H20
19,3 K20, G20, W20
19,4 B20
19,5 L20, T20
19,6 U20

Block 20 (Consonant digraphs; Double Consonants)

20,1 Three-syllable words with suffixes: -y, -ful, -al, -able, -eth, -less, -ist, -ish
20,2 PH10, CH31
20,3 TH12
20,4 CC11

Block 21 (Palatalizations)

21,1 Three-syllable words with prefixes: un-, re-, dis-, in-, mis-
21,2 -tion
21,3 -sion
21,4 -ture

Block 22 (Nonaffixed three-syllable words)

22,1 Stress pattern 3B
22,2 Stress pattern 3A
22,3 Stress pattern 3C
22,4 Stress pattern 3D

Fourth Year

(Low-frequency primary and secondary vowels; Four-syllable words; Affixes; Four-syllable stress patterns)

Block 23 (Specific primary vowel rules)

23,1 A29, A24

23,2 I35, I25

23,3 Y11, Y13, Y15, Y16

Block 24 (Four-syllable words; Rules for exceptions to general primary vowel Rule 13)

24,1 Four-syllable compounds

Four-syllable words with suffixes: -ing, -y, -er, -or, -en, -ed, -ly

24,2 E38, I38, A38, O38

24,3 A29, I28, Y28, O28, E28

24,4 General primary vowel Rule 27

Block 25 (Remaining general primary vowel rules)

25,1 Four-syllable words with -tion

25,2 I26, Y26, U26, E26, O26, A26

25,3 I26, Y36

25,4 A12, I12, Y12, O12, U12

25,5 E14, I14, Y14, A14, O14, U14

Block 26 (Low-frequency secondary vowel rules)

26,1 Four-syllable words with suffixes: -able, -ment, -al, -ness -ary, -ist

26,2 IE17, EY17

26,3 AI17

26,4 EA33

26,5 IE12, EI10

26,6 EY10, EI20

26,7 -ous, OU31, OU35, OU33, OU34

26,8 UI31

Block 27 (Four-syllable words; General primary vowel Rule 32)

27,1 Four-syllable words with prefixes: un-, in-, dis-, mis-

27,2 Stress pattern 4A and 4B

27,3 Stress pattern 4C

27,4 Stress pattern 4D

27,5 Other four-syllable words (miscellaneous stress patterns)

27,6 E32, O32, A32, I32

DETAILED DISCUSSION OF RULE SEQUENCE

First Year

(One-syllable words; Single consonants; Geminate consonants; Digraphs; Short vowels)

Frequency = 796

Block 1 (Highest frequency single consonants; Geminate consonants; General primary vowel Rule 15: short vowels)

Frequency = 315

Unit 1:	N10, NN10, T10, (TT10), A15, I15	Frequency = 10
Unit 2:	P10, (PP10)	Frequency = 11
Unit 3:	L10 (7)*, LL10 (3), S10 (27), SS10 (3)	Frequency = 40
Unit 4:	D10 (14), DD10 (1), E15 (32)	Frequency = 47
Unit 5:	M10 (32), (MM10), B10 (28), (BB10), U15 (41)	Frequency = 101
Unit 6:	R10 (45), (RR10), H10 (22), O15 (39)	Frequency = 106

As explained in detail above, preparatory to specifying the contents of Block 1, the relative frequency of occurrence within the entire lexicon was determined for each single-grapheme consonant rule. The nine identified as being the most frequent (r, t, n, l, s, d, p, m, b) were then combined with the short-vowel rules. It was decided that instruction on short-vowel rules would precede instruction on long-vowel rules because the short-vowel rules are more productive and less environmentally complex than the long-vowel rules. The central concern at this point was that the sequence should begin with the most productive combination of rules. Therefore, the word-list was edited to eliminate words considered to be of low utility in initial reading instruction (e.g., ass, bade, pith).

---

*Numbers in parentheses are frequencies of individual rules.

Then the rule-content of Unit 1 of Block 1 was established by comparing the number of remaining 2-, 3-, and 4-letter lexicon words produced by all possible sequences of short-vowel and selected consonant rules. The optimal initial combination proved to be n, t, a, and i, and so the rules covering these graphemes formed Unit 1.

A similar procedure was used in calculating the sequence for the remaining units in Block 1. Each position in the sequence was filled by that rule which, in combination with all previously taught rules, would produce the most exemplars. Exemplars were considered to enter the sequence in the unit introducing the rule completing that exemplar's component letters. For example, the word ten would enter the sequence in Block 1, Unit 4, because although T10 and N10 are introduced in Unit 1, E15 is not introduced until Unit 4. The rule rank-ordering which resulted from this determination of sequence-position productivity was divided into units of instruction with consideration given to the size of exemplar and instruction increments from unit to unit. See Appendix E for details.

Instruction on consonant geminates was sequenced in the same unit as each geminate's corresponding single consonant (e.g., N10 and NN10 both appear in Unit 1) because, in most instances, geminate consonants have the same pronunciation as their corresponding single consonant's highest frequency rules, which are the rules introduced in Block 1. The instruction to the learner will be to treat the geminate as if it were single. There are very few exceptions to this "rule," and they will not enter until later. The reasoning behind such spelling patterns as double consonants (e.g., the effect of single versus double consonants on preceding vowels) will be presented when letter environments become specified and contrastable. Geminate consonants which have no exemplars at their time of introduction are reintroduced as their exemplars enter the sequence.

While double consonants occur in English orthography, they are not allowed in English phonology, except across word or morpheme boundaries, e.g., bookcase, unknown. (In some languages, such as Italian, double consonants are phonemically distinct from single consonants.) Geminate correspondences do not occur in word-initial position. They are primarily found in medial position in words, with the following environment:

$$\text{single letter} \rightarrow \text{geminate } /\breve{V}\_\_\begin{Bmatrix}V\\ le\\ ly\end{Bmatrix}.$$

The only geminates in final position which have more than three SWRL lexicon exemplars are ck (a digraph which functions as the nonexistant kk geminate would), ff, ll, ss, and zz. There are no geminates for h, j, v, w, x, and y.

> Except for the Spanish borrowing llama, [and Welsh Lloyd and Llewellyn] geminate consonants occur only in medial and final position in English spelling. The most common final clusters are ff, ll, and ss.... Rare final clusters are bb, dd, gg, nn, rr, tt, and zz.... (Venezky, 1970, p. 106, fn. 8).

1,1[1]: N10: n → [n], e.g., an

NN10: nn → [n], e.g., inn

T10: t → [t], e.g., at

TT10: tt → [t], e.g., (little), (mitt)[2]

A15: a → [æ]/__C(C)#, e.g., at, ant

I15: i → [ɪ]/__C(C)#, e.g., it

---

[1] In this notation, the first number signifies the block, and the second the unit.

[2] Exemplars in parentheses are introduced in later blocks. No exemplars of their particular environments enter in the blocks in which the rule in question is sequenced.

As discussed above, Unit 1 is composed of the rules N10, T10 (plus their geminate rules), A15, and I15, these being the rules which together produced the most, albeit a small number of exemplars (10).

NN10: The geminate grapheme nn has the invariant pronunciation [n] as in NN10. The only words in modern English with final nn are inn and proper names.

TT10: The geminate grapheme tt has the invariant pronunciation [t] as in TT10. Final tt occurs in only two lexical words (butt, mitt) and proper names. However, final tte, pronounced [t], also occurs finally (barrette, brunette, and rosette). Although TT10 is sequenced here in Block 1, Unit 1, for reasons discussed above, the first occurrence of TT10 exemplars is in Block 9, Unit 2.

Ai5: In certain dialects, some words may use [a], e.g., Eastern and British glass, dance.

1,2: P10: p → [p], e.g., pin

PP10: pp → [p], e.g., (pepper)

Unit 2 was limited to one rule to compensate for the relatively large instruction load necessary in Unit 1. The rule selected for Unit 2, P10, is the rule which, when added, produced the most exemplars in combination with the rules in Unit 1.

P10: The geminate grapheme pp has the invariant pronunciation [p] as in PP10. There are no occurrences of final pp, except in proper names. The first occurrence of PP10 exemplars is in Block 9, Unit 2.

1,3: L10: l → [l], e.g., lip

LL10: ll → [l], e.g., pill

S10: s → [s], e.g., sat

SS10: ss → [s], e.g., pass

The remaining short-vowel and high-frequency, single-consonant rules were combined and rank-ordered by additive productivity. They were then divided into Units 3-6. In Unit 3, the rules L10, S10, and their geminates are sequenced.

L10: The grapheme l has only two pronunciations: [l] as in L10, and [Ø] as in L20 and L40, except for in the word colonel.

LL10: The geminate grapheme ll has the invariant pronunciation [l] as in LL10, except in borrowed Spanish words; e.g., tortilla. LL is the most frequent consonant geminate in the lexicon.

SS10: After ll, ss is the second most frequent double consonant in the present lexicon. A large number of its occurrences are in the suffixes -less, and -ness, introduced in Second Year.

S10: Following the introduction of S10, both s → [s] and s → [z] plurals and 3rd-person singulars of exemplars are allowed in order to facilitate the approximation of natural speech in the beginning stories. The correct pronunciations of regular plural morphemes are automatic in speech (e.g., kit[s] vs. kid[z] vs. kiss[ɪz]). But since the appropriate response to the printed s may not

S10, cont. occur automatically, instruction may explicitly acknowledge the alternative [s] and [z] pronunciations of the morpheme -s and the exemplars could be separated for instruction on [s] and [z] pronunciations. The [ɪz] pronunciation of -es is sequenced in Year 2 because of the additional, unstressed vowel. The [z] pronunciation of the inflectional ending -s is the first instance of an alternative to a grapheme unit's most frequent pronunciation, and the first step in preparing the learner to make varying pronunciation responses to a single letter. For all other rules in Block 1, only one pronunciation per letter will be taught. Rule environments will not be made explicit at this point, since alternative pronunciations depending on contrasting rule environments are not yet presented.

1,4: D10: d → [d], e.g., did

DD10: dd → [d], e.g., add, (hidden)

E15: e → [ɛ]/ˊ__C(C)#, e.g., set, lend

Unit 4 is composed of D10, DD10, and E15.

D10: Verb past tenses are presently introduced in Second Year because of the variations in the pronunciation of the e as well as the d in the -ed endings (e.g., kill[d] vs. kiss[t] vs. kid[ɪd]). If however, it is found that these variations are not difficult for beginning readers to decode, then it is advised that the suffix -ed be allowed in Block 1, as was -s, in order to better

D10, cont. approximate natural speech in the stories. The same suggestion is made very strongly for the verb suffix -*ing*, and also to a much lesser degree for the bound morpheme suffixes -*er*, -*y*, and -*ly* (all of which are presently sequenced in Second Year).

DD10: The grapheme *dd* as the invariant pronunciation [d] as in DD10. The only words, besides proper names, in modern English with final *dd* are *add* and *odd*.

1,5: M10: *m* → [m], e.g., *man*
MM10: *mm* → [m], e.g., (*mammal*)
B10: *b* → [b], e.g., *but*
BB10: *bb* → [b], e.g., (*bubble*)
U15: *u* → [ə]/__C(C)#, e.g., *up*, *bump*

The rules in Unit 5 are M10, B10, their geminates MM10, BB10, and U15.

M10: The grapheme *m* has the invariant pronunciation [m] as in M10, except in the nonlexicon words *comptroller* and *mnemonic*.

B10: The grapheme *b* has only two pronunciations: [b] as in B10 and [∅] as in B20 and B40.

MM10 & BB10: The geminate graphemes *mm* and *bb* have the invariant pronunciations [m] as in MM10 and [b] as in BB10, respectively. The first occurrence of their exemplars is in Block 9, Unit 2. There are no occurrences of final *mm*, except in proper names. And other than proper names, the only word in modern English with final *bb* is *ebb*.

U15: The U15 exemplars with the environment /__r have been recoded as U21s. For instructional purposes, they have been placed in Block 9, Units 1 and 2 with the other Vowel 21 exemplars. U15 and U16 /__r have the same [ɚ] pronunciation as E21 and I21.

1,6: R10: r → [r], e.g., run, (far)

RR10: rr → [r], e.g., (hurry)

H10: h → [h], e.g., had

O15: o → [a], e.g., hot, odd

Sequenced in Unit 6 are the rules R10, RR10, H10, and O15.

R10: The grapheme r has the invariant pronunciation [r] as in R10, except in the words acre and ogre. Also, in some dialects, the r following a vowel is dropped. Parallel to Rule LE22 (sequenced in Block 10, Unit 2) there could be a rule RE22: re → [ər] /C__#, e.g., acre, ogre. As just noted, these are the only irregular r exemplars in the present lexicon.

RR10: The geminate grapheme rr has the invariant pronunciation [r] as in RR10. The geminate rr occurs finally in only two lexical words (burr, purr) and proper names. The first occurrence of RR10 exemplars is in Block 9, Unit 1.

H10: The grapheme h has only two pronunciations: [h] as in H10, and [∅] as in H20 and H40. There is no geminate hh. The frequency of H10 would have placed it in a later block. It was sequenced into Unit 6 of Block 1, however, due to the decision that the component graphemes

H10, cont. (e.g., s, t, h) of a digraph (e.g., sh, th in Block 2) should be introduced before the digraphs themselves.

Block 2 (Digraphs)

Frequency = 50

Unit 1: SH10 Frequency = 28

Unit 2: TH13 (6), TH11 (16) Frequency = 22

Digraphs are presented and employed as graphemic units because their pronunciation is not a combination of common pronunciations of their component letters. They are introduced in Block 2, prior to the remaining single consonants, because of the high-frequency function word exemplars of the digraph rule TH13 and the need for these function words in the story-construction aspect of reading instruction.

2,1: SH10: sh → [š], e.g., shut

SH10 is the first rule taught in Block 2 because it is the highest frequency digraph and so was considered to be an appropriate choice for introducing digraphs. SH10 also has more exemplars with Block 1 graphemes than the remaining single consonants, sequenced in Block 4, do. The grapheme unit sh has the invariant pronunciation [š] as in SH10.

2,2: TH13: th → [ð] in pronouns, conjunctions,
and function words, e.g., them, then, this

TH11: th → [θ], e.g., thin

In Unit 2, TH11 is introduced at the same time as TH13, which has the function word exemplars, because of the near identity of the two th correspondences, [ð] and [θ] which differ only in voicing.

Also, with three lexical exceptions (*clothes*, *eighth*, and *isthmus*), the grapheme *th* has only two pronunciations: [θ] as in TH11, and [ð] as in TH12 and TH13. TH12 is not introduced at this point because it occurs in words with long vowels and/or two syllables. TH12 also has a specifiable environment and so will be sequenced after instruction employs rules which require attention to surrounding letters. The TH11 [θ] pronunciation could be contrasted with the TH13 [ð] pronunciation although most speakers probably do not realize that two pronunciations do exist for the grapheme *th*.

Whether or not the alternate pronunciations of TH11 and TH13 should be specified is a question which should be studied empirically. For example, in a blending exercise, could *Ss*, when taught the [θ] pronunciation of *th*, pronounce a word correctly that had a [ð] correspondence? In other words, is the necessary phonetic alteration a natural one? If both pronunciations are taught, how should *Ss* be instructed to discriminate between exemplars having the TH13 [ð] pronunciation (function words) and those having the TH11 [θ] pronunciation (content words)? In a recent study, Marsh and Sherman (1970) have found that *Ss*, age 5, make few if any errors discriminating between the aurally-presented [ð] and [θ] sounds in isolation or in the words *thy* and *thigh*. If *Ss* had not been able to differentiate between the two, then only one of the two sounds would need to be taught. At the present, it appears that the instructor would best acknowledge the existence of two pronunciations for *th*, and then in blending lessons use the appropriate isolated pronunciation of *th* for the word to be blended. In the reading lessons, the *Ss* would simply be reminded of the alternate pronunciation whenever an error was made. Once *Ss* read fluently enough to be affected by syntactical constraints, there should be few errors made between the [ð] of *th* function words and the [θ] of *th* content words.

NG10: A third high-frequency digraph, NG10 could be added to Block 2. NG10 has a high rule frequency and its exemplars have high individual frequencies. If -*ing* verb suffixes are allowed in Block 1, as suggested, then the beginning reader should have no problem reading base words which include the grapheme unit -*ing* (e.g., *sing*, *thing*). And one-syllable NG10 base words having other preceding vowels (e.g., *rang*, *rung*) should then present little, if any, more difficulty. The unit -*ong*, however, might best be postponed until Block 13, Unit 3 (with the introduction of Rule O24), unless it is found that the readers are not confused by the dialect variation of *o* → [ɔ], or [a]/__ng.

Block 3 (Geminate vowel; Long vowel at end of word)

Frequency = 51

Unit 1: EE10 (36), E25 (4) Frequency = 40

Unit 2: Y19 Frequency = 11

The rules EE10 and E25 are positioned here in the sequence because their exemplars have high individual frequencies (i.e., they are common words). Rule Y19 is included because, like E25, it has a long vowel pronunciation in a /#(C)C__# environment (or in a stressed syllable). Rule 025 would have been included here for the same reason exept it has too few exemplars and it also has exceptions which themselves have high individual frequencies.

3,1: EE10: ee → [i], e.g., beet

E25: e → [i] /#(C)C__#, e.g., we, she

The long vowel e geminate, EE10 (e.g., see) and the long vowel e, E25, at the end of one-syllable, one-orthographic-vowel words (e.g., me), expose the reader to and prepare him for alternate pronunciations of vowels (in this case, the long-vowel sound of e in VCe# exemplars), which will be elaborated upon in later blocks. This block also adds to the concept of letters representing more than one pronunciation.

The grapheme ee has an invariant pronunciation [i] as in EE10, except in the words been, breeches, and creek (in some dialects), and in borrowed French words, such as matinee. The long-vowel pronunciation rule following from the double e stimulus is specific to e.

E25: Rule E25 occurs in an /#(C)C__# (one-syllable) environment. An E25 exemplar has no other vowel, whereas an E18 exemplar (to be introduced in Block 6) would have another vowel: VCe#. The grapheme e in an /#(C)C__# environment has the invariant pronunciation [i], except in the words re and the.

Long e in word-final position, introduces some high-frequency words (e.g., he, she) as rule exemplars instead of as sight words. Also, attention is now focused on what will later be crucial word aspects, since this is the first instance of a pronunciation of a graphemic unit depending on an explicitly taught rule cueing on an environment (in this case, the end of a word).

3,2: Y19: y → [ay] /__# in
stressed syllables, e.g., try, (deny)

In Unit 2, Rule Y19 occurs in word-final position in one-syllable words (e.g., /__#). Y19 exemplars in stressed syllables will enter in Block 8, Unit 2 when two-syllable words are introduced. (Final y in unstressed syllables has a Rule Y17 [i] or [ɪ] pronunciation. See Block 10, Unit 2).

Block 4: (Less frequent consonants)

Frequency = 380

Unit 1:	F10 (51), FF10 (9), W10 (31)	Frequency = 91
Unit 2:	K10 (37), N20 (34), C12 (59), CK10 (57)	Frequency = 187
Unit 3:	G12	Frequency = 65
Unit 4:	J10 (12), X10 (14), Y10 (6)	Frequency = 32
Unit 5:	V10 (2), Z10 (2), ZZ10 (1)	Frequency = 5

Block 4, the final block of First Year, includes the remaining single consonants (i.e., those not taught in Block 1), as well as the digraph ck. Also, the [ŋ] velarized allophone of n (Rule N20), which occurs before [k] or [g] is allowed following the introduction of k. This pronunciation shift is another which should be relatively automatic and need not be dealt with more explicitly than to note it.

4,1: F10: f → [f], e.g., fat

FF10: ff → [f], e.g., stiff

W10: w → [w], e.g., wet

Block 4's five most frequent consonants, in rank-order, are: K10 (+N20), G12, C12, F10, and W10. F10 and W10 have lower frequencies than do K10, G12, and C12. However, [f] and [w] do not have environment-dependent grapheme correspondences as does [k], and they do not have environment-dependent pronunciations as do c and g. Therefore, it was decided that F10 and W10 would be less difficult correspondences to learn and so would be more appropriate for Unit 1 than the other rules.

F10: The letter f has the invariant pronunciation [f] as in F10, except in the word of.

FF10: The geminate grapheme ff has the invariant pronunciation [f] as in FF10.

W10: The letter w has only two pronunciations: [w] as in W10, and [∅] as in W20 and W40. There is no geminate ww.

4,2: K10: k → [k], e.g., milk

N20: n → [ŋ],

$$\left\{\begin{array}{c} \text{x} \\ \text{k} \\ \text{qu} \\ \text{g pronounced [g]} \\ \text{c pronounced [k]} \end{array}\right\} \begin{array}{l} \text{(anxious)} \\ \text{thank} \\ \text{(banquet)} \\ \text{(single)} \\ \text{(Lincoln)} \end{array}$$

C12: c → [k] /__

$$\left\{\begin{array}{c} \text{a} \\ \text{o} \\ \text{u} \\ \text{C} \\ \# \end{array}\right\} \begin{array}{l} \text{cat} \\ \text{cot} \\ \text{cut} \\ \text{crash} \\ \text{(picnic)} \end{array}$$

CK10: ck → [k], e.g., kick

The rules K10 (+N20), C12, and CK10 are combined for Unit 2 because they share a common pronunciation, [k].

K10: The letter *k* has only two pronunciations: [k] as in K10, and [Ø] as in K20.

CK10: The digraph *ck* has the invariant pronunciation [k] as in CK10.

N20: Regarding the Rule N20, it is optional to acknowledge the automatic sound change of *n* → [ŋ] $/\_\_\begin{Bmatrix}[k] \\ {[g]}\end{Bmatrix}$. Since Rule N20 is used in coding, this is where it should first have exemplars, due to Rule K10. Even if Rule N20 is not specifically taught, the exemplars would enter here.

C12: The most frequent and least complex pronunciation rules for the letters *c* and *g* are introduced in Block 4--the [k] sound of *c* and the [g] sound of *g*, as exemplifed in the words *call* and *gas*. The alternative [s] sound of *c* and [ǰ] sound of *g* (e.g., *ice*, *age*) have a more complex environment and their occurrence is often associated with the long-vowel rule. Consequently, these two rules (C11 and G11) have been sequenced in Second Year, following the introduction of the long-vowel rules.

Rule C12 occurs in the environment $/\_\_\begin{Bmatrix}a \\ o \\ u \\ C \\ \#\end{Bmatrix}$. This environment should be contrasted with the $/\_\_\begin{Bmatrix}e \\ i \\ y\end{Bmatrix}$ environment of C11, when the latter is introduced in Block 7. The only lexicon exception to C12 (i.e., to

$\underline{c} \rightarrow [k]$ for that environment) is the word muscle; nonlexicon exceptions are *czar*, *indict*, *facade*.

4,3: G12: $$\underline{g} \rightarrow [g]\ /\ \_\_ \left\{\begin{array}{c} a \\ o \\ u \\ C \\ \# \end{array}\right\} \quad \begin{array}{l} \underline{\text{gas}} \\ \underline{\text{got}} \\ \underline{\text{gum}} \\ \underline{\text{grin}} \\ \underline{\text{bag}} \end{array}$$

Rule G12 is sequenced in Unit 3, immediately following C12, because of their similarity in environmental constraints on pronunciations: $\underline{c} \rightarrow [k]$ and $\underline{g} \rightarrow [g]\ /\ \_\_ \left\{\begin{array}{c} a \\ o \\ u \\ C \\ \# \end{array}\right\}$. G12 has the same environment as C12, and it contrasts with G11 just as C12 does with C11. The geminates *gg* and *cc* are sequenced in Second Year because their pronunciation ([g] and $[g\check{j}]$; [k] and [ks]) are determined by the following vowel.

The only exceptions to G12 (i.e., to $\underline{g} \rightarrow [g]$ for that environment) are the word *judgment* and the letter combination *gn* in which $\underline{g} \rightarrow [\emptyset]\ /\ \left\{\begin{array}{l} \#\_\_n \\ \_\_n(e)\# \end{array}\right\}$. Final *g* occurs only in a small number of words, mostly monosyllables.

Rule G31 ($\underline{g} \rightarrow [g]\ /\ \_\_ \left\{\begin{array}{c} e \\ i \\ y \end{array}\right\}$) is an exception to Rule G11 ($\underline{g} \rightarrow [\check{j}]\ /\ \_\_ \left\{\begin{array}{c} e \\ i \\ y \end{array}\right\}$), but it has the same [g] pronunciation as G12. G31 is presently sequenced in Block 11, Unit 6, but it could be resequenced here in Block 4, Unit with G12, although it's only exemplars at that point would be *get*, *gift*, *gig*, and *gill*.

4,4: J10: $j \rightarrow [\check{j}]$ *jet*

X10: $x \rightarrow [ks]$ *box* (*oxen*)

Y10: $y \rightarrow [y]$ *yet*

The consonants in Unit 4 (J10, X10, Y10) and in Unit 5 (V10, Z10, ZZ10) have very low frequencies. They are nevertheless included at the end of First Year so that, in order to encourage increased independence in dealing with words encountered outside of the program, beginning readers will have learned at least one (and the major) pronunciation of each letter in the alphabet. The letter *q*, represented by the digraph *qu*, was inadvertantly omitted from Year 1. QU10 would have only 7 exemplars if sequenced in Block 4, Unit 5. However, it should probably be included for the same reason V10, Z10, and ZZ10 are--to provide one pronunciation for each letter.

J10: The letter *j* has the invariant pronunciation [ǰ] as in J10, except in borrowed Spanish words, such as *frijoles* and *marijuana*, and in the nonlexicon word, *hallelujah*. There is no geminate *jj*. The letter *j* generally occurs initially, sometimes medially, and never finally; nor can it occur doubled. The grapheme unit *dg* is used instead of doubled *j*, and *dge* or *ge* is used instead of final *j*.

X10: The letter *x* has only two pronunciations: [ks] as in X10 and [gz] as in X40, except for the [z] pronunciation in initial position, as in such nonlexicon words as *xylophone*, *xerox*, and *xylem*. The letter *x* in final position is always pronounced [ks] as in X10. There is no geminate *xx*.

Y10: As a consonant, the letter y has the invariant pronunciation [y] as in Y10. It is relatively infrequent in Modern English, occurring primarily in initial position, and in medial position in the words beyond, canyon, and lawyer. The letter y occurs nine times more often as a vowel than as a consonant. There is no geminate yy.

4,5: V10: v → [v] vest

Z10: z → [z] zig-zag

ZZ10: zz → [z] buzz (dazzle)

V10, Z10, and ZZ10 are sequenced last in First Year due to their very low frequency.

V10: The letter v has the invariant pronunciation [v] as in V10. When [v] is final in a word, v is always followed by e (e.g., have, sleeve), except in names and the slang term rev. Double v is rare in English, and there are no lexical exemplars.

Z10: The letter z has the invariant pronunciation [z] as in Z10, except in the words waltz, glazier, and azure, and in nonlexicon borrowed French words, such as rendezvous. The letter z is the least frequently used letter in Modern English.

ZZ10: The grapheme unit zz has the invariant pronunciation [z] as in ZZ10, except in the word pizza. The geminate zz occurs finally only in the words buzz, fuzz, and jazz. The first occurrence of ZZ10 exemplars is in the Block 10, Unit 1.

Since there are only five lexicon exemplars of V10, Z1C, and ZZ10 at this point in the sequence, others could be introduced orally, and instruction on the correspondence should be repeated, if necessary, when other exemplars enter the sequence in Second Year.

Second Year

(Two-syllable words; Long-vowels; Vowel-r; Other high-frequency vowel rules; High-frequency digraphs; Unstressed vowels; Common exceptions to Vowel rules; High-frequency secondary vowels)

Frequency = 2299

Block 5 (Compounds; Suffixes, NG10)

Frequency = 68 (plus base words with suffixes)

Unit 1: Compounds Frequency = 36

Unit 2: The -ing suffix with previously introduced based words.

Unit 3: The -es suffix (plurals and third-person singular, present tense forms) with previously introduced base words.

Unit 4: The -ed suffix (past tense) with previously introduced base words.

Unit 5: NG10 Frequency = 32

Block 5 introduces two-syllable words, beginning with their least complex compounds and inflectional endings. Unit 1 contains compounds of previously introduced words, Unit 2 contains -ing endings of lexicon base words, Unit 3 contains the -ed ending for past tense and adjectives, and Unit 4 contains the -es ending for plurals and third-person singulars of base words. The exemplars in Units 1-4 involve First Year rules. They will thus serve as a review of pronunciation rules already covered, in addition to introducing the concept of syllables. Although environments can be specified for the [d], [t], and [ɪd] pronunciations of the -ed endings, it is not planned to teach these environments. Exemplars may, however, be grouped for instruction and practice according to these various pronunciations. The digraph -ng is also introduced in one-syllable NG10 exemplars since the pronunciation is the same as in the *-ing* suffixes of Unit 2.

5,1: Compounds using First Year rules (first syllable stressed), e.g., *bathtub*

In Unit 1, lexicon compounds using First Year rules are introduced, but nonlexicon compounds of other previously taught base words are also allowed. For example, the word *standstill* is not in the lexicon, but could be introduced here because its components *stand* and *still* have already entered the sequence.

5,2: *-ing* suffix with previously introduced base words, e.g., *running*

In Unit 2, which introduces the *-ing* gerund suffixes of base words, exemplars are presently uncoded, but could be separated for instruction between those which do have to double the final consonant of the base word before adding the *-ing* suffix (CVC base words where the final consonant is not an *x*) and those which do not. The *-ing* noun and adjective forms of base words, which are less frequent than the verb form, could be introduced either here or where now sequenced in 11,1 with two-syllable NG10 and other digraph exemplars.

5,3: *-es* suffix (plurals and third-person singular, present tense forms) of previously introduced base words, e.g., *boxes*

Unit 3 introduces *-es* [ɪz] plurals and third-person singulars of base words. Exemplars are presently uncoded, but involve base words ending in *-sh*, *-s*, *-ss*, and *-zz*. The *-es* endings of *-ch* and *-tch* base words should be introduced in 11,2 where CH10 and TCH10 are sequenced for instruction. If too much confusion arises for the readers concerning the unstressed [ɪz] pronunciation of the *-es* suffix, this unit could be postponed until after the unstressed E17 rule has been introduced in 10,1. The -s [s] and [z] endings of all previously taught base words have been allowed as soon after 1,3 as the base words themselves were introduced. Exception: The -ies endings of Y19 base words will be introduced in 11,2 with Y17 exemplars which also involve suffixed forms in which the y changes to i + es. The -s → [s] or [z] plurals of VCe base words enter the sequence in 7,2.

5,4: -ed suffix (past tense) of previously introduced base words, e.g., stopped

Unit 4 introduces the -ed [d], [t], and [ɪd] past tenses and adjectives of base words. Exemplars are presently uncoded, but could be separated for the three pronunciations. If too much confusion arises for the readers concerning the unstressed [ɪd] pronunciations of the -ed suffix, these exemplars could be postponed until after E17 has been introduced in 10,1. The -ied endings of Y19 base words will be introduced in 10,2 with the -ied endings of Y17 base words. It would be optional to point out the silent e pronunciation in the -ed [d] and [t] exemplars. In speech, the correct pronunciation choice, [d], [t], or [ɪd], is made automatically.

E19: This rule applies when -ed or -es is a past tense or plural form (and not pronounced [əd] or [əz]), whether or not there is a simple verb or singular form (cf, Rule S31). Rule E19 has been used for coding purposes; in teaching, this should be considered a regular automatic phonological alternation (see Rule D10 and S10). Cf, Venezky (1970) and Vachek (1959).

5,5: NG10: ng → [ŋ], e.g., *ring*

Unit 5 introduces Rule NG10 in one-syllable exemplars. NG10 is included in Block 5 because its [ŋ] pronunciation was introduced in 5,2 for the -*ing* suffix. It is suggested that the first NG10 exemplars to be introduced be those in which the vowel is *i* (e.g., *ring*, *sing*, *thing*, *wing*) since the readers would already be familiar with the -*ing* correspondence.

As discussed in Block 2, the Rule NG10 could advisably be sequenced with the digraphs SH10, TH11, and TH13. The revision would be due to the allowance of -*ing* suffixes in Block 1 and to the fact that Rule NG10 itself is of high frequency, and its individual exemplars are too.

Block 6 (General primary vowel Rule 11)

Frequency = 259

Unit 1: E18, A11 (108), I11 (68) Frequency = 176

Unit 2: O11 (60), U11 (16), E11 (3), EE10 + E18 (4) Frequency = 83

Block 6 introduces general primary vowel Rule 11, the -VCe long vowel rule, which is the second most frequent type of vowel rule after the general primary vowel Rules 15 and 16, the short vowel rules. The -VCe rules are the first rules in the sequence whose environment specifies a particular letter (final, silent *e*). And these rules should be contrasted with the -VC(C) short vowel environmental characteristics. Rule 11 covering the silent final -*e* in -VCe words can also be contrasted with Rule E25 (3,1) covering the pronounced final *e* in one-vowel exemplars such as *he*.

The Vowel 11 rules are divided into Units 1 and 2 by frequency, with All being the most frequent, and Ell the least.

6,1: E18: e → [ø] /__#, e.g., name, (edge)

All: a → [e] /__Ce#, e.g., name

I11: i → [ay] /__Ce#, e.g., fine

All: Rule All generally is automatically pronounced [ɛ] (or [æ] in some dialects) in an /__re environment.

E18: Final e is silent, except when part of a secondary vowel or when the only vowel in a word (see Rule E25). Final silent e performs a number of functions (see Jespersen, 1965, p. 193). Its primary use is as a marker of the long-vowel pronunciation in general primary vowel Rule 11. It also marks the pronunciation of c, g, and th (see Rules C11, G11, and TH12). A final e after s in some words differentiates between a base form (e.g., dense) and an inflected form (e.g., dens). v and u generally do not occur finally, but are followed by an e; e.g., have, continue (see general primary vowel Rule 38, and Rules U20, U26, and QU10). Sometimes final e may have two functions, as in nice where it marks both the i → [ay] (Rule I11) and the c → [s] (Rule C11) correspondences.

6,2: O11: o → [o] /__Ce#, e.g., home

U11: u → [(y)u] /__Ce#, e.g., cute, crude

E11: e → [i] /__Ce#, e.g., eve

OII: Rule OII has the dialect variation [o], [ɔ], [a] in this same /__re environment.

UII: In regard to Rule UII, some of its exemplars are always pronounced [yu], some are always pronounced [u], and others can be pronounced either way. When following [r] or [l], it is always [u]; when following [t, d, s, z, š, ž, č, ǰ, n], it is generally [u], although there is some dialect variation. When following vowels or other consonants, it is generally [yu]; when word initial, it is always [yu]. The [yu] and [u] pronunciations are designated for the exemplars in the Word List in Section II of Volume II.

Block 7 (CII, GII; suffixes with general primary vowel Rule II)

Frequency = 36

Unit 1: CII (26), GII (10) Frequency = 36

Unit 2: -s, -d, and -ing suffixes added to words with primary vowel Rule II

Block 7 introduces the alternative pronunciation of c and g. These rules state that c → [s] and g → [ǰ] when followed by e, i, or y. These correspondences require discrimination of an environment which may occur in various places in a word, and which specifies several alternate letter choices as determiners of the application of the rule. Thus, they are more complex than the -VCe (Vowel II) rule, since they are not cued by as simple a condition as the final e of the long vowel exemplars. The CII and GII rules are sequenced to follow instruction on the Vowel II long vowel rules because CII and GII most often occur in the Vowel II -VCe environment, as -Vce and -Vge.

7,1: C11: $c \rightarrow [s] / \_\_ \begin{Bmatrix} e \\ i \\ y \end{Bmatrix}$, e.g., cent, lace, (city), (lacy)

G11: $g \rightarrow [\check{j}] / \_\_ \begin{Bmatrix} e \\ i \\ y \end{Bmatrix}$, e.g., gem, age, gin, (gypsy)

When C11's and G11's environments ($/ \_\_ \begin{Bmatrix} e \\ i \\ y \end{Bmatrix}$) are contrasted with the more frequent C12's and G12's ($/ \_\_ \begin{Bmatrix} a \\ o \\ u \\ C \end{Bmatrix}$), it should be pointed out to the readers that C11 and G11 do most often occur in a -VCe environment and that C12 and G12 cannot occur in this environment. The G12 pronunciation, [g], however, can occur initially or medially when followed by e or i; e.g., get, girl. These "frequent exceptions" to G11 are coded as G31 and are sequenced in 11,6.

Lexicon exceptions to C11 are pronounced [š] or [č]: licorice, ocean, species, and the irregularly-spelled endings -cion, -cious, -cier, -science, -scious; nonlexicon exceptions are: arcing, cello, concerto, sceptic. It can also be pointed out to the readers that although the letter combination sc is usually pronounced [sk], it is pronounced [s] when it precedes e, i, or y as in scene, scenic, science, scissors.

7,2: -s, -d, and -ing suffixes added to words with general primary vowel Rule 11, e.g., races, raced, racing

Unit 2 introduces the -s, -d, and -ing suffixes of Vowel 11, long-vowel (-VCe#) base words just as Block 5 introduced these suffixes for Vowel 15, short-vowel (-VC(C)#), base words. For the -s endings, the final e remains and is silent. For the -d endings, the final e remains and is silent, except when the final consonant is d or t; then the -ed ending is pronounced [ɪd]. For the -ing endings, the e is dropped. This will have to be pointed out to the readers. Exemplars for these base words plus suffixes are presently uncoded although the base words themselves are coded and are sequenced for instruction in Blocks 6, 7, and subsequent blocks.

Block 8 (Two-syllable words, first syllable stressed)

Frequency = 70

Unit 1: Compounds with rules in Blocks 5-7 Frequency = 45

Unit 2: A16 (7), E16 (2), I16 (3), O16 (10), U16 (3) Frequency = 25

Block 8 is, in effect, a review block and a further step in the gradual introduction of two-syllable words.

8,1: Compounds with rules in Blocks 5-7, e.g., livestock

In Unit 1, all but two of the compounds, which involve rules from Blocks 5-7 (i.e., NG10, Vowel 11s, C11, G11), have Vowel 11 rules in them. For the compounds which have V11 correspondences at the beginning of the compound, it should be pointed out to the reader that it is because these exemplars are compounds that the e now in the middle of the word is still silent and not pronounced (e.g., firefly is pronounced [fáyrflay], not [fə́rəfli] or [fayrˊflay]).

8,2: A16: a → [æ] /__CC..., e.g., accent

I16: i → [i] /__CC..., e.g., insect

U16: u → [ə] /__CC..., e.g., umpire

E16: e → [ɛ] /__CC..., e.g., reptile

O16: o → [o] /__CC..., e.g., costume

Unit 2 introduces general primary vowel Rule 16 in two-syllable words with the first syllable stressed. Rule 16s have the same short-vowel pronunciation in a /__CC... environment as Rule 15s, taught in First Year, did in a /__C(C)# environment. This is the first instance in the sequence of two-syllable words other than compounds and base words plus suffixes. Only exemplars having the first syllable stressed are taught here so that readers will not have to consider stress as well as syllabification. Words with the second syllable stressed are not introduced until the end of Block 10, and could even be postponed until the end of this Second Year sequence.

U16: Unlike the other vowels, the vowel u has the same pronunciation [ə] before an r as it does before other consonants. The instruction on U16 /__r, however, seemed more appropriately placed with instruction on the Vowel 21s (/__Vr), so these exemplars were recoded as U21s and sequenced with the other Vowel 21s in Block 9.

Block 9 (Vowels before r)

Frequency = 322

Unit 1: one-syllable: A21 (40), O21 (26), U21 (15), I21 (14), E21 (12) Frequency = 107

Unit 2: two syllables, first syllable stressed: E21 (150), U21 (5), I21 (4), A21 (18), O21 (15) Frequency = 192

Unit 3: A25 (11), O22 (12) Frequency = 23

Block 9 introduces the next most frequent primary-vowel rule (after short and long vowels) in one-syllable words, the Vowel 21 rules. These rules cover the pronunciation of a vowel when followed by r. Since the ar rule (A21) is the most frequent of these rules, it comes first in the sequence. It is followed by or (021), whose dialectical variations [o], [ɔ], and [a] should be acknowledged. The er, ir, and ur rules specify the same pronunciation, [ɚ] ([ər]), and are grouped together for this reason. These E21, I21, and U21 rules have the [ɚ] pronunciation whether they are stressed or unstressed. A21 and 021, however, while sharing this [ɚ] pronunciation when unstressed, do have different pronunciations when stressed. Thus, all -Vr correspondences (or -VrC, but not -Vrɛ) are pronounced [ɚ] except for stressed ar and or.

E21, I21, U21, and all Vowel 17s followed by r, are pronounced as in -er, which can be written phonetically as [ər] in order to have a separate symbol for the vowel and consonant, or as [ɚ] since the sounds cannot be divided. In some dialects, the r following a vowel is not pronounced; in such a case, the phonetic representation of the -Vr would be [ə].

The -Vr rules are followed by A25 and 022, which are rules covering an exception to ar and or in which a different pronunciation occurs when ar or or are preceded by w. These war and wor rules also provide the first instance in the sequence of a correspondence with an environment specifying what precedes as well as what follows the rule-grapheme.

9,1: A21: $\underline{a} \rightarrow [a] \,/\, \_\_ \begin{Bmatrix} rC \\ r\# \end{Bmatrix}$, e.g., cart, car

021: $\underline{o} \rightarrow$ [o], [ɔ], [a] / __r, e.g., horn

U21: $\underline{u} \rightarrow [ə] \,/\, \_\_ \begin{Bmatrix} rC \\ r\# \end{Bmatrix}$, e.g., fur, burn

I21: $\underline{i} \rightarrow [ə] \,/\, \_\_ \begin{Bmatrix} rC \\ r\# \end{Bmatrix}$, e.g., bird, sir

E21: $\underline{e} \rightarrow [ə] \,/\, \_\_ \begin{Bmatrix} rC \\ r\# \end{Bmatrix}$, e.g., herd, her

Unit 1 introduces Vowel 21 rules in one-syllable words.

021: There is considerable variation in the pronunciation of or, but most individual speakers will use only one form for all pronunciations. However, in some dialects, -oar- and -our- (pronounced [o]) may differ from -or- (pronounced [ɔ]). Thus, for some speakers, hoarse contrasts with horse, and mourning contrasts with morning.

9,2: E21: e → [ə] / ___ $\left\{\begin{matrix} rC \\ r\# \end{matrix}\right\}$, e.g., western, father
(plus -er suffix with previously introduced words, e.g., banker.)

U21: u → [ə] / ___ $\left\{\begin{matrix} rC \\ r\# \end{matrix}\right\}$, e.g., sunburn, murmur

I21: i → [ə] / ___ $\left\{\begin{matrix} rC \\ r\# \end{matrix}\right\}$, e.g., birdseed

A21: a → [a] / ___ $\left\{\begin{matrix} rC \\ r\# \end{matrix}\right\}$, e.g., farmer, streetcar

021: o → [o], [ɔ], [a] / ___ $\left\{\begin{matrix} rC \\ r\# \end{matrix}\right\}$, e.g., order, popcorn

Unit 2 introduces the Vowel 21 rules in two-syllable words having the first syllable stressed.

E21: E21 is taught first in Unit 2 because it has far more exemplars than any of the other Vowel 21 rules. The unstressed forms of -er are allowed both because of their high frequency and because their pronunciation [ɚ], is the same as for stressed E21, taught in Unit 1.

Instruction on E21 in Unit 2 commences with the -er agent noun forms and comparative adjective forms of base words, including those in which the final consonant is doubled before the -er. Agent and comparative forms of other previously taught words (including words with Vowel Rule 11) can also be taught here.

In most dialects, base words ending in ng retain their regular NG10 pronunciation, [ŋ], when the -er agent form suffix is added, but change to a [ŋg] pronunciation for the -er comparative form; e.g., singer, vs. stronger.

I21 & U21: I21 and U21 also have the same pronunciation, [ɚ], when stressed or unstressed but there are no lexicon exemplars of unstressed ir, and the only exemplars of unstressed ur (auburn, sulphur, suburb, surprise) cannot enter the sequence here due to their having other components which have not yet been taught.

A21 & O21: Unstressed ar and or receive instruction in 10,1 with other unstressed vowels rather than here, since their unstressed pronunciations, involving schwa, do differ from their stressed pronunciations.

9,3: A25: $\underline{\text{a}} \rightarrow [\text{o}] \,/\, \left\{\begin{matrix}\text{wh}\\ \text{w}\\ \text{qu}\end{matrix}\right\} \_\_\text{r}$, e.g., (wharf), war, (quart)

O22: $\underline{\text{o}} \rightarrow [\text{ə}] \,/\text{w}\_\_\text{rc}$, e.g., word, worth

Rules A25 and O22 are introduced in Unit 3. Both share the $/\text{w}\_\_\text{rC}$ environment, but A25 also occurs in the environment: $/\left\{\begin{matrix}\text{w}\\ \text{wh}\\ \text{qu}\end{matrix}\right\} \_\_\text{r} \left\{\begin{matrix}\#\\ \text{C}\end{matrix}\right\}$.

A25: The /wh__r and /qu__r exemplars of A25 enter the sequence in Block 11, Units 3 and 4, with WH10 and QU10, respectively, Thus, only the /w__r $\left\{\begin{matrix}\#\\ C\end{matrix}\right\}$ environments need be taught here. A25 has a dialect variation of [o] and [ɔ] which should be acknowledged if necessary. The only exception to A25 is -ward when it is an unstressed syllable (i.e., awkward, forward), in which case the pronunciation of the ar is [ɚ], just as it is for any other unstressed -Vr.

022: 022 occurs in a /w__rC environment (e.g., work). The only exception to 022 is the word worn (derived from wore, which is regular by Rule 011 or 021).

Block 10 (Unstressed vowels; Two-syllable words with second syllable stressed)

Frequency = 575

Unit 1: General primary vowel Rule 17, first syllable stressed: 117 (36), U17 (6), E17 (89), A17 (45), 017 (37)
Frequency = 213

Unit 2: Y17 (142), LE22 (84) Frequency = 226

Unit 3: Compounds, second syllable stressed Frequency = 8

Unit 4: Two-syllable words, second syllable stressed: 116 (14), U16 (5), A16 (4), 016 (2), E21 (4), 021 (2), EE10 (9)
Frequency = 40

Unit 5: General primary vowel Rule 17, two-syllable words, second syllable stressed: A17 (39), E17 (19), 017 (31), U17 (5), 117 (2)
Frequency = 88

Block 10 introduces the unstressed ([ə] or [ɪ]) pronunciation of unstressed vowels. Not all unstressed vowels are reduced to a [ə] or [ɪ] pronunciation, and for any one speaker, a given vowel when reduced may be pronounced [ə] in one word and [ɪ] in another word (e.g., for some speakers, the u in circus would be pronounced [ɪ], while the u in album would be pronounced [ə]). Beginning readers often have difficulty with the unstressed vowel concept because when they are first learning to decode words, they tend to give a stressed pronunciation to all the graphemes. This problem, however, will probably be largely overcome as the readers learn about syllabification and stress.

If syllabification is taught at all, it should be flexible so that readers are not forced, for example, to divide the word mistake into mis-take′ rather than what for them might be more natural: mi-stake′. In regard to stress patterns, readers would benefit from the information that there are many times more words with the first syllable stressed than with the second syllable stressed. In the SWRL lexicon, the ratio is 4:1 for two-syllable words, and 2:1 for three-syllable words. Four-syllable words have more complex stress patterns.

10,1: (First syllable stressed)

I17: i → [ə], [ɪ] in unstressed syllables, e.g., pilgrim, furnish

U17: u → [ə], [ɪ] in unstressed syllables, e.g., album, campus

E17: e → [ə], [ɪ] in unstressed syllables, e.g., tunnel, hidden

A17: a → [ə], [ɪ] in unstressed syllables, e.g., final, canvas

O17: o → [ə], [ɪ] in unstressed syllables, e.g., cotton, actor

Unit 1 commences with the rules I17 and U17 because the unstressed pronunciation of each is usually the same as its short pronunciation ([ɪ] and [ə], respectively). Rules E17, A17, and 017 are then sequenced by frequency.

E17: Superlatives (-est) of base words are uncoded in the lexicon but should be taught with E17, perhaps as the first exemplars of this rule. For the suffixes -less, -ness, -en, and -ed, allow these forms of any previously taught base words, as well as the lexical exemplars.

A17 & 017: A17 and 017 exemplars should be separated for those which occur in the environment $/\_\_r \begin{Bmatrix}\# \\ C\end{Bmatrix}$ because ar and or change from Rules A21 and 021 pronunciations (A21: [a]; 021: [o], [ɔ], [a]) to A17 and 017 pronunciations ([ə]) when unstressed. E17, I17, and U17 $/\_\_r \begin{Bmatrix}\# \\ C\end{Bmatrix}$, on the other hand, have the same [ɚ] pronunciation as E21, I21, and U21.

U17: This rule was used only with words in which [ə] could not be indicated by using Rules U15 and U16, when u appeared in an unstressed syllable.

10,2: Y17: y → [i], [ɪ] /__# in unstressed syllables, e.g., candy

LE22: le → [əl] /C__#, e.g., little, stable

The rules Y17 and LE22 are included in Block 10 with unstressed vowels because they are always unstressed. These two rules occur at the end of the second syllable in words having the first syllable stressed. All their exemplars occur in the environment /...C__#.

LE22: The grapheme unit, le, is invariantly pronounced [əl] as in LE22 when in the environment /...C__# (cf, L10, E18: le → [l] /V__#: e.g., pale, style).

Y17: The pronunciation of Y17, unstressed y in word-final position, has the dialect variation [i] or [ɪ]. In isolation [i] is more common, but unstressed [ɪ] (cf, general primary vowel Rule 17) is often used in connected speech. *Webster's Seventh New Collegiate Dictionary* (1967) uses [i]; *Webster's New World Dictionary* (1957), and Kenyon and Knott (1953, p. 481) use [ɪ] but acknowledge the [i] pronunciation.

Y17 primarily occurs in -ly adverbial endings and -y adjectival endings of base words. The rule is productive and uncomplex allowing for additional practice on previously introduced rules contained in its exemplars.

For both Y17 and Y19, stressed y in word-final position, the y remains y /__ing. Y17 also occurs, and remains y, before other suffixes beginning with the letter i (e.g., ish, ist). Before suffixes not beginning with the letter i, however, in both Y17 and Y19 the y changes to i. For Y19, $\underline{y} \rightarrow \underline{i}\ /\_\_\begin{Bmatrix} ed \\ es \end{Bmatrix}$, and the i retains the [ay] pronunciation of the y in the Y19 base words. For Y17, too, the $\underline{y} \rightarrow \underline{i}\ /\_\_\begin{Bmatrix} ed \\ es \end{Bmatrix}$, and for these exemplars, the i retains the [i] pronunciation of the y in the Y17 base words. Y17 also occurs, and changes to i, before other suffixes not beginning with the letter i (e.g., -er, -est, -less, -ly, -ment, -ness).

10,3: Compounds (second syllable stressed), e.g., herself

Units 3-5 introduce two-syllable words having the second syllable stressed. Heretofore in the sequence, the two-syllable words taught have had the first syllable stressed. In these units of Block 10, some exemplars with the second syllable stressed are introduced, thus providing the contrast necessary for identifying the concept of stress. The first exemplars with the second syllable stressed are compounds, presented in Unit 3. These lexical compounds are composed of all previously taught rules. Nonlexicon compounds of other previously taught basewords are also allowed.

10,4: (Second syllable stressed)

I16: i → [ɪ] /__CC..., e.g., inform
U16: u → [ə] /__CC..., e.g., unless
A16: a → [a] /__CC..., e.g., accept
O16: o → [a] /__CC..., e.g., trombone
E21: e → [ə] $/\_\_\left\{\begin{smallmatrix} rC \\ r\# \end{smallmatrix}\right\}$, e.g., perhaps
O21: o → [o], [ɔ], [a] /__r, e.g., cornet
EE10: ee → [i], e.g., indeed

Unit 4 introduces noncompound two-syllable words with the second syllable stressed, utilizing all previously taught rules except vowel Rule 17, that could have such exemplars at this point in the sequence. Many of the exemplars involve prefixes such as in-, dis-, un-.

10,5: (Second syllable stressed)

A17: a → [ə], [ɪ] in unstressed syllables, e.g., alike

E17: e → [ə], [ɪ] in unstressed syllables, e.g., except

O17: o → [ə], [ɪ] in unstressed syllables, e.g., connect

U17: u → [ə], [ɪ] in unstressed syllables, e.g., subtract

I17: u → [ə], [ɪ] in unstressed syllables, e.g., divide

Unit 5 introduces Vowel 17 exemplars which are two-syllable words having the second syllable stressed. Most of these exemplars also involve prefixes, such as a-, ex-, con-, pro-.

Block 11 (Consonant digraphs; GG10, CC12, G31)

Frequency = 214

Unit 1: NG10 Frequency = 41

Unit 2: CH10 (60), TCH10 (36) Frequency = 97

Unit 3: WH10 Frequency = 23

Unit 4: QU10 Frequency = 24

Unit 5: GG10 (17), CC12 (2) Frequency = 19

Unit 6: G31 Frequency = 10

Block 11 introduces the rules for the common digraphs ch, wh, and qu. Also covered are the nonverb form exemplars of NG10, the geminates GG10 and CC12, and G31, a common exception to G11.

11,1: NG10: ng → [ŋ] /__#, e.g., ring

Unit 1 introduces NG10's -ing noun and adjective forms of base words. All of these exemplars can also be verbs and so could be sequenced in 5,2 with the uncoded -ing verb forms of base words (or in Block 2 if NG10 and -ing suffixes are moved up in the sequence). NG10 also has final -ing exemplars which are not verb, noun, or adjective forms of base words (e.g., cunning, darling). These too, are sequenced here, but if the noun and adjective forms are moved up in the sequence, these could be as well. The grapheme has other pronunciations besides [ŋ]. These pronunciations and their corresponding rule combinations are: ng → [ŋg]: N20, G12; ng → [ŋg]: N20, G31; and ng → [nǰ]: N10, G11. It is suggested that these correspondences be introduced here in 11,1 as a contrast to NG10's two-syllable exemplars, or in Third Year if the decision is made to sequence all of NG10's exemplars in Block 5 (or Block 2).

11,2: CH10: ch → [č], e.g., church

TCH10: tch → [č], e.g., match

The rules CH10 and TCH10 are sequenced together in Unit 2 because of their shared pronunciation, [č], and complementary distributions. CH10 occurs primarily in word-initial position and following a consonant or secondary vowel in word-final position (i.e., /#__ and /...C__#). TCH10, on the other hand, does not occur initially, and it primarily occurs following a short vowel in word-final position (i.e., /...V__#). The es → [ɪz] plurals of base words ending in ch and tch should be sequenced in this unit.

TCH10: The grapheme tch is invariantly pronounced [č] as in TCH10.

11,3: WH10: wh → [hw] or [w], e.g., when

Unit 3 introduces WH10, which has the dialect variation: [w] or [hw]. The grapheme unit wh has only two pronunciations: [w] (or [hw] in some dialects) as in WH10 and [h] as in WH40.

11,4: QU10: qu → [kw], e.g., quick

Rule QU10 is introduced in Unit 4. The letters qu are considered a grapheme unit because, in English words, the letter q is always followed by u. The grapheme unit qu has only two pronunciations: [kw] as in QU10, and [k] as in QU40. The exemplars for Rule A25, itself sequenced in 9,3, which occur in the environments /wh__r and /qu__r, should be introduced in Block 11's Unit 3 and Unit 4 respectively. The remaining digraph rules, GH10, which is silent, and PH10, CH31, and TH12, which are all low-frequency correspondences, are sequenced in Third Year.

11,5: GG10: gg → [g], e.g., egg, wiggle

CC12: $cc \rightarrow \begin{Bmatrix} a \\ o \\ u \end{Bmatrix}$, e.g., yucca, accord, hiccup

The geminate consonant rules GG10 and CC12 are sequenced in 11,5 rather than in Block 4, Units 2 and 3, with C12 and G12 because all of their exemplars (except egg) occur in two-syllable words and most of these exemplars include rules introduced in Block 10.

GG10: The grapheme gg is invariantly pronounced [g] as in GG10, except in the word suggest.

CC12: The grapheme cc has two pronunciations: [k] as in CC12, and [ks] as in CC11, which is sequenced in Third Year. Both of these rules have so few exemplars (CC12: 3, and only two of these can enter the sequence here; CC11: 4) that it would be advisable to postpone instruction on CC12 until 20,4, where CC11 and the other lowest frequency consonants are sequenced.

11,6: G31: g → [g], e.g., get, girl

If CC12 is deleted from Block 11, then Rule G31, sequenced in Unit 6, could be moved up into Unit 5 with GG10. Both have a [g] pronunciation. G31 is an exception to Rule G11, which has the same $/\_\_\left\{\begin{matrix}e\\i\\y\end{matrix}\right\}$ environment. As an alternative to sequencing G31 here in Block 11, Unit 5 or 6, its one-syllable exemplars could be taught either with Rule G12 (g → [g]) in 4,3, or as exceptions to Rule G11 in 7,1 (although there would only be four exemplars at either point). The two-syllable -nger exemplars of G31 could then be introduced in Block 11 or Third Year with the N20, G12 and N10, G11 contrasts to Rule NG10.

Block 12 (High-frequency secondary vowels)

Frequency = 478

Unit 1:	AY10	Frequency = 49
Unit 2:	EA11 (142), EA31 (42)	Frequency = 184
Unit 3:	OO12 (89), OO11 (54)	Frequency = 143
Unit 4:	OW11 (60), OW12 (43)	Frequency = 102

The only secondary vowel rule to have entered the sequence before Block 12 is Rule EE10, which was introduced in First Year, Block 3, because of its high rule frequency and its high individual exemplar frequencies. Also, as a geminate vowel rule having the same pronunciation as its individual letters' name ([iy], e), EE10 is considered to be instructionally uncomplex. The other secondary vowel rules have been divided into three groupings according to the combined considerations of frequency, contrasting homographs (i.e., same grapheme, but different phoneme), and homophones (i.e., same phoneme, but different grapheme), a number of which are in complementary distribution.

The first group of secondary vowels, introduced here, have high rule frequencies and high individual exemplar frequencies. Three of the rules have contrasting homograph correspondences presented with them. The second group of secondary vowels, introduced in Block 16 of Third Year, have medium frequencies (with the exception of high-frequency AI10 and OU10, which could be resequenced into Second Year) and are subgrouped by homophones with complementary distributions. The third group of secondary vowels, introduced in Block 26 of Fourth Year, have low rule frequencies.

The contrasting correspondences for the grapheme units ea, oo, and ow are sequenced as units because each correspondence has a high rule frequency and/or high individual exemplar frequencies and because none has specifiable environmental constraints which are simple enough for the younger reader to remember. If it is found that, in these instances, it is not practical to teach the readers alternate pronunciations simultaneously, then, of course, the contrasting correspondences could be sequenced in a later block.

12,1: AY10: ay → [e], e.g., day

Block 12's introduction of secondary vowels commences with Rule AY10 because of that rule's regularity and its high individual exemplar frequencies. The grapheme unit ay is invariantly pronounced [e] as in AY10, except for aye and says (although, in unstressed syllables, ay may be pronounced [i] or [ɪ], e.g., Sunday).

If the learning load will allow, it is suggested that Rule AI10 be sequenced here with AY10 rather than in Third Year, as at present. As well as having a high rule frequency, Rule AI10 has the same pronunciation as, and is in complementary distribution with AY10. The letters *i* and *y*, and *u* and *w*, are in complementary distribution in several secondary vowels: *ai/ay*; *au/aw*; *ei/ey*; *eu/ew*; *oi/oy*; and *ou/ow*. In general, *y* and *w* are found in word-final position and *i* and *u* elsewhere (e.g., *day/daily*; *coy/coil*), although this pattern does not always hold. Secondary vowels, in fact, are generally limited in their distribution; e.g., several of them do not occur initially.

12,2: EA11: *ea* → [i], e.g., *each*

EA31: *ea* → [ɛ], e.g., *bread*

Unit 2 introduces the contrasting rules EA11 (*ea* → [i]) and EA31 (*ea* → [ɛ]). EA11 and EA31 share most of their environments, so it is very difficult to give readers a basis for determining the correct pronunciation of the grapheme *ea*, except that EA11 does have three times more exemplars than EA31. Some homographs with *ea* can be distinguished only by their grammatical function, e.g., *lead*. EA11 and EA31 sometimes alternate for present and past tenses, e.g., *read/read*, *mean/meant*.

EA11: The following environments apply to EA11, but not EA31:

$$/\_\_ \left\{\begin{matrix} \# \\ c\ldots \\ ch \\ g\ldots \\ l \\ m \\ p \\ sh \end{matrix}\right\}$$

Other environments which apply to EA11, but not EA31, are:

$/\_\_\left\{\begin{matrix}\text{se}\\ \text{son}\\ \text{sy}\\ \text{tuer\#}\\ \text{the\#}\end{matrix}\right\}$. These will be introduced in Third Year, where their component rules (e.g., S20) are sequenced.

EA31: The environment /__lth applies to EA31, but not to EA11. The environments $/\_\_\left\{\begin{matrix}\text{sant\#}\\ \text{sure\#}\\ \text{ther\#}\end{matrix}\right\}$ also apply to EA31, but not to EA11. They will be introduced in Third Year. Other environments, e.g., $/\_\_\left\{\begin{matrix}\text{d}\\ \text{f}\\ \text{r}\end{matrix}\right\}$ apply both to EA11 and EA31.

12,3: 0011: *oo* → [u], e.g., *broom*

0012: *oo* → [ʊ], e.g., *book*

Unit 3 introduces the rules 0011 (*oo* → [u]) and 0012 (*oo* → [ʊ]). The following environments apply to 0011, but not to 0012: $\left\{\begin{matrix}\#\\ \text{n}\\ \text{m}\\ \text{p}\\ \text{st}\\ \text{th}\end{matrix}\right\}$

The environments $/\_\_\left\{\begin{matrix}\text{h}\\ \text{se}\end{matrix}\right\}$ also apply to 0011, but not to 0012. They will be introduced in Third Year. There is no environment that applies only to 0012 and not to 0011, although the environment /__k applies primarily to 0012.

12,4: OW11: *ow* → [o], e.g., *below*, *own*

OW12: *ow* → [aw], e.g., *allow*, *owl*

Unit 4 introduces the rules OW11 (*ow* → [o]) and OW12 (*ow* → [aw]). The grapheme unit *ow* has only two pronunciations: [o] as in OW11, and [aw] as in OW12, except for the word *knowledge*. Also, in some dialects, an unstressed OW11 is pronounc[illegible] [ə].

The primary environment for OW11 is /__#, particularly at the end of two-syllable words, but a number of OW12 words have the /__# environment in one-syllable words. There are no other specifiable environments to distinguish the use of [o] or [aw] for the grapheme unit ow.

Because of its high frequency and its being in complementary distribution with OW12 (ow → [aw]), Rule OU10 (ou → [aw]) would be more appropriately sequenced, following OW12, as Unit 5 of this Block 12 rather than as it is now in Third Year with the medium-frequency secondary vowels.

Block 13 (Additional common primary vowel rules)

Frequency = 197

Unit 1:	031 (38), U31 (35)	Frequency = 73
Unit 2:	A23 (26), 023 (26)	Frequency = 52
Unit 3:	122 (21), 024 (51)	Frequency = 72

Block 13 introduces some additional rules for primary vowels. Teaching these rules, rather than just teaching as sight words the high-frequency words containing these rules, not only allows the introduction of additional lower frequency words, but continues the emphasis on the nearly comprehensive pronunciation predictability of English words. Instruction will be based on specifiable environments, when this is a rule characteristic. When not, the exemplars will be taught as groups of words, each group manifesting an exception to previously learned rules. The rules vary in predictability from the highly predictable Rule A23 to the unpredictable 031.

13,1: 031: o → [ə], e.g., won, love

U31: u → [ʊ], e.g., bull, push

Unit 1 introduces the common vowel rule exceptions, Rules 031 (o → [ə]) and U31 (u → [ʊ]).

031: Rule 031 occurs in stressed syllables where other pronunciations would be expected. In fact, there are no 031 environments which do not also apply to other o rules. Rule 031 generally occurs in the following environments: $/\_\_\left\{\begin{matrix}n\\m\\th\\v\end{matrix}\right\}$

U31: Rule U31 occurs primarily in the suffix, -ful, as well as in the word full and compounds of it. Otherwise, its environments are generally $/\left\{\begin{matrix}b\\p\end{matrix}\right\}\_\_\left\{\begin{matrix}ll\\sh\end{matrix}\right\}$. No other rules for the grapheme u (e.g., U15, U16, U17) have these environments.

13,2: A23: a → [ɔ] $/\_\_\left\{\begin{matrix}ll\\lk\\lt\\ld\end{matrix}\right\}$, e.g., ball, walk, salt, bald

023: o → [o] /__ lC#, e.g., roll, yolk

Unit 2 introduces Rules A23 (a → [ɔ]) and 023 (o → [o]), both of which occur in the environments $/\_\_\left\{\begin{matrix}ld\\ll\\lt\end{matrix}\right\}$. Rules A23 and 023 also occur in the environment /__lk, but these exemplars, due to the silent l, will be introduced in Third Year.

023: Rule 023 applies in the environment /__l# in stressed syllables. The only lexical exemplars are control and patrol, which are presently coded as exceptions, but which could be sequenced in this unit.

13,3: 122: $\underline{i} \rightarrow [\text{ay}] / \_\_\begin{Bmatrix} \text{nd} \\ \text{ld} \\ \text{gn} \end{Bmatrix} \#$, e.g., *find*, *wild*, *sing*

024: $\underline{o} \rightarrow [\text{ɔ}]$ or $[\text{a}] / \_\_\begin{Bmatrix} \text{fC} \\ \text{g\#} \\ \text{ng} \\ \text{nk} \end{Bmatrix}$, e.g., *soft*, *dog*, *song*, *honk*

Unit 3 introduces Rules 122 ($\underline{i} \rightarrow [\text{ay}]$) and 024 ($\underline{o} \rightarrow [\text{ɔ}]$ or [a]).

122: Rule 122 occurs in the environments $/\_\_\begin{Bmatrix} \text{nd\#} \\ \text{ld\#} \end{Bmatrix}$. 122 also occurs in the environment /__gn#. These exemplars, due to the silent $\underline{g}$ (Rule G20), are sequenced in 19,3 of Third Year with the introduction of silent letters.

024: Rule 024 has the dialect variation [ɔ] or [a] and occurs in the environments $/\_\_\begin{Bmatrix} \text{fC} \\ \text{g\#} \\ \text{ng} \\ \text{nk} \end{Bmatrix}$. These environments apply to Rule 024, but not to any other $\underline{o}$ rules. The words *on* and *onto*, coded as "016...P" (i.e., $\underline{o} \rightarrow [\text{a}]$, with other pronunciations recognized), also have this [ɔ] and [a] dialect variation. The following environments apply to Rule 024, but also to other $\underline{o}$ rules: $/\_\_\begin{Bmatrix} \text{ss} \\ \text{st} \\ \text{th} \end{Bmatrix}$. The environment /__st will be deleted from future versions of this rule since there are nearly as many exceptions (pronounced [o]) as exemplars (ct, *lost* and *most*).

In dialects where [a] and [ɔ] contrast, the occurrences of these sounds "is highly erratic, varying not only regionally, but also from word to word" (Kurath, 1964, p. 112). This affects the following rules in particular: 024, 021, and A24.

Block 14 (Nonlong vowels in -VC(C)e words)

Frequency = 80

Unit 1: Vowel 16s in Stressed -VCCe#	Frequency = 35
Unit 2: Vowel 21s in Stressed -VrCe#	Frequency = 18
Unit 3: Vowel 17s in Unstressed -VCCe# and -VCe#	Frequency = 27

Block 14 introduces the short vowel pronunciations in the environment -VCCe, which is similar to both the previously specified short vowel (-VCC$\{\begin{smallmatrix}\#\\V\end{smallmatrix}\}$) and long vowel (-VCe) rules. In the case of -VCCe exemplars, however, the final silent e does not mark a long vowel pronunciation, but rather the e marks a morphemic boundary and/or the pronunciation of the final consonant. In nearly all of the exemplars in this block, the final consonant is c, g, s, or v. Without the following e, the graphemes c and g would be pronounced [k] and [g] rather than [s] and [ǰ] (e.g., compare the nonword sinc with since, and urg with urge). Without the marker e, an s might be pronounced [z] or appear to be a plural (e.g., dens vs. dense). And final v does not occur in English (e.g., twelv would be a nonword).

14,1: stressed VCCe#, e.g., dance

In Unit 1, the specific consonants in the -VCCe environments of these short vowels are: -dge, -nCe, (-nce, -nse), and -lCe (-lve, -lse, -lge). Examples are badge, dance, and shelve.

14,2: stressed VrCe#, e.g., nurse

In Unit 2, the consonants in the -VrCe environments of these vowel 21s (vowels followed by r) are: -rse (e.g., curse), -rve (e.g., carve), and -rge (e.g., charge).

14,3: unstressed VCCe# and VCe#, e.g., absence

In Unit 3, the consonants in the unstressed -VCCe and -VCe environments of the Vowel 17s (unstressed vowels) are: -nce (e.g., absence), -Vge (e.g., bandage), and -Vce (e.g., furnace).

If program developers find that the readers are too confused by the nonlong vowel pronunciations in -VCCe exemplars as opposed to the regular long vowels in -VCe environments, then the correspondences and exemplars in Block 14 could be postponed until Third Year. Otherwise, as sequenced here, Block 14 would be the final instructional segment in Second Year.

Third Year

(8-9 age-level words; three-syllable words; Medium-frequency primary and secondary vowels; Low-frequency consonants; Silent letters; Major palatalizations; Affixes; Three-syllable stress patterns)

Frequency = 3213

Block 15 (Review, employing 8-9 words covered by First- and Second-Year rules)

Frequency = 904

Unit 1: 8-9 one-syllable words with First Year rules Frequency = 84

Unit 2: 8-9 words with Second Year rules Frequency = 820

Block 15 is a review block, employing all 8-9 age-level words covered by First and Second Year rules. It provides an opportunity for expanding reading vocabulary by adding more rule-based words known by the child.

15,1: 8-9 one-syllable words with First Year rules

15,2: 8-9 words with Second Year rules

This unit provides for the systematic review of Second Year correspondences. Since age-grading of the present lexicon is not completely accurate, some of these words could be added to the Second Year word list if desired. The words in this unit might also be used for Second Year word-attack study.

Block 16 (Secondary vowels of medium frequency)

Frequency = 488

Unit 1: AI10 Frequency = 135

Unit 2: OU10 Frequency = 98

Unit 3: OE10 (7), OA10 (82) Frequency = 89

Unit 4: AW10 (44), AU10 (17) Frequency = 61

Unit 5: OI10 (26), OY10 (22) Frequency = 48

Unit 6: UE10 (20), UI10 (7), EW10 (30) Frequency = 57

Block 16 introduces secondary vowels of medium frequency. High-frequency secondary vowels are introduced in Second Year (Block 12); low-frequency ones are introduced in Fourth Year (Block 26). If desired it would be possible to move some of the correspondences in Block 16 to one of the other blocks of secondary vowels.

16,1: AI10: ai → [e], e.g., pain

The secondary vowel ai occurs initially and medially and is in complementary distribution with ay, which occurs finally (AY10; 12,1). In some words, ay changes to ai when a suffix is added, e.g., day, daily (cf, -ly, 17,3). For ai in unstressed syllables, see Rule AI17 (26,3). Major exceptions to Rules AI10 and AI17 are said and again, both with [ɛ].

16,2: OU10: ou → [aw], e.g., found

Rule OU10 occurs initially and medially, and is in complementary distribution with Rule OW12 (12,4), which generally occurs finally. There are four other minor pronunciations for ou (introduced in Block 26), although they occur in several high-frequency words.

16,3: OE10: oe → [o] /__#, e.g., toe

OA10: oa → [o], e.g., boat

Both secondary vowels in this unit are pronounced [o]. OE10 comes first because of its similarity to OI1 (6,2) with oCe.

OE10: Medial oe is generally a combination of o and e, e.g., poet (see Rule 026, 25,2). The major exception to Rule OE10 is the word shoe and its derivatives.

OA10: The major exception to this rule is the word broad and its derivatives.

16,4: AW10: aw → [ɔ], e.g., law

AU10: au → [ɔ], e.g., cause

These two secondary vowels are in complementary distribution, aw generally occurring finally and au occurring initially and medially. The pronunciation of these secondary vowels is [ɔ], or for some dialects and speakers, [a] (e.g., Rule 015); thus dawn and Don may not contrast.

AW10: This rule is invariant, with no exceptions.

AU10: This rule is nearly invariant, with only a few exceptions, notably laugh and aunt.

16,5: OI10: oi → [oy], e.g., coin

OY10: oy → [oy], e.g., boy

These two secondary vowels are in complementary distribution, oy generally occurring finally and oi occurring initially and medially. Both rules are nearly invariant, with rather minor exceptions.

16,6: UE10: ue → [(y)u], e.g., due, hue

UI10: ui → [(y)u], e.g., fruit

EW10: ew → [(y)u], e.g., few

All three secondary vowels in this unit have the same pronunciation, [(y)u]; see 6,2 for comments on the pronunciation of the "long-*u*" sound.

UE10: The spelling *uel* is considered to be pronounced [(y)u], although it may often be disyllabic ([(y)úəl]), e.g., *fuel* (cf, Rule U26; 25,2). All exceptions to this rule are cases of silent final *ue* after *g*; i.e., *ue* → Ø /g__#; e.g., *league*.

UI10: All exceptions to this rule are pronounced [ɪ], e.g., *build*, and are classified under Rule U31 (26,8).

EW10: The secondary vowel *ew* generally occurs finally and is in complementary distribution with *eu*, which occurs initially and medially. Because of low frequency, a correspondence for *eu* was not included in the present rule set. However, it is as follows: *eu* → [(y)u], e.g., *feud*, *Eugene*. Rule EW10 is nearly invariant, with the primary exception being *sew* and its derivatives.

Block 17 (Suffixed and compound three-syllable words; Suffixes)

Frequency = 402

Unit 1:	Three-syllable compounds	Frequency = 123
Unit 2:	Two-syllable words with suffixes: -*er* (45), -*en* (9), -*ing* (16), -*y* (14), -*s* (49), -*ed* (29)	Frequency = 162
Unit 3:	Three-syllable words with suffixes: -*er* (48), -*en* (3), -*ing* (12), -*ed* (6), -*ly* (48)	Frequency = 117

17,1: Three-syllable compounds

This unit marks the first appearance of three-syllable words. The gradual introduction of three-syllable words continues in the first unit of each block until Block 22, where they are thoroughly taught.

At this point and hereafter, it is possible to add three-syllable compounds formed by combining previously taught one- and two-syllable words.

17,2: Two-syllable words with suffixes: -er, -en, -ing, -y, -s, -ed

These suffixes have been allowed previously and this unit is a "clean-up" operation. Many of the words have a final silent e in their base form; in their suffixed form, the first (long) vowel in the words could also be described by general primary vowel Rule 13 (18,1).

Words coded with Rules E19 and S31 have been included in this unit. These rules were used for coding purposes and need not be explicitly taught, since they are not spelling-to-sound correspondences, but automatic morphological changes.

-s: Most of the words in this unit ending in -s are (1) not plurals, e.g., hers, (2) plurals with no base form, e.g., suds, (3) plurals with a base form not a noun, e.g., blinds, or (4) plurals with a different meaning from the noun base form, e.g., glasses. In addition, in this unit most exemplars of the ending are pronounced [z].

-ed: Most of the words in this unit ending in -ed are past participles commonly used as adjectives (e.g., mashed), sometimes without a base form, (e.g., ashamed) or with a base form not a verb (e.g., famed).

17,3: Three-syllable words with suffixes: -er, -en, -ing, -ed, -ly

Some of the words in this unit are compounds which do not exist as a compound base form without the suffix; e.g., nutcracker is not formed from nutcrack. Rather, these words are compounds of a base word plus a suffixed word, e.g., nut + cracker.

At this point and hereafter, the suffixes from this unit plus -(e)s may be added to any two-syllable word to form a three-syllable word.

-ed: In this unit, all examples of -ed are pronounced [əd] and form adjectives.

-ly: There is generally no change in a base word when -ly is added. However, if the base ends in unstressed y (Y17: [i]), the y changes to i (I17: [ɪ] or [ə]) when -ly is added, e.g., happily. The suffixed form -fully (e.g., cheerfully) is sometimes pronounced as one syllable [fli].

Block 18 (Primary-vowel and single-consonant rules of medium frequency)

Frequency = 512

Unit 1: E13 (121), O13 (72), A13 (43), I13 (39), U13 (29) Frequency = 304

Unit 2: S20 (94), S21 (56) Frequency = 151

Unit 3: A22 Frequency = 29

Unit 4: 025 Frequency = 28

Block 18 introduces additional primary vowel rules of medium frequency, as well as the remaining correspondences for s. The rules in this block primarily involve multisyllable words.

18,1: E13: e → [i] /__CV, e.g., cedar
O13: o → [o] /__CV, e.g., open
A13: a → [e] /__CV, e.g., baby
I13: i → [ay] /__CV, e.g., final
U13: u → [(y)u] /__CV, e.g., duty

In this unit, general primary vowel Rule 13 is introduced: V → [V̌] /__CV. This is related to general primary vowel Rule 11 (the "VCe" rule: V → [V̄] /__Ce#; Block 5), but with the environment extended to all vowels after a single consonant and to e when not in final position. There are many exceptions (V → [V̌] /__CV) to Rule 13, which is one of the least reliable among the present set of correspondences. Some exceptions are covered by general primary vowel Rules 27, 28, and 38 (Block 24).

While there is no adequate solution for handling exceptions to Rule 13 in terms of spelling-to-sound correspondences, an instructional solution can be suggested: teach children to have a set for diversity (cf, Levin & Watson, 1963a, b; Williams, 1968) when encountering vowels in the environment /__CV (where C ≠ r, which requires Vr rules). The decoding strategy is as follows:

i. try a long-vowel pronunciation (Rule 13);

2. if (1) does not produce a known word, try a short-vowel pronunciation.

The third step is a more general one which must be used in decoding words of more than one syllable.

3. if (1) and (2) do not produce a known word, try a schwa [ə] pronunciation (a vowel Rule 17 pronunciation).

To develop the above strategy, it is suggested that, after Rule 13 is taught, exceptions be introduced, perhaps as exemplars of an exception rule. Exceptions to general primary vowel Rule 13 can be found among the irregularly-spelled words (Volume II, Section III), indicated as follows:

$V \rightarrow [\check{V}] / \_\_CV$

or: a → [æ] / __CV

e → [ɛ] / __CV

i → [ɪ] / __CV

o → [a] / __CV

u → [ə] / __CV

E13: Many exemplars of this rule involve the prefix re- (e.g., repay) or the pseudo-prefixes be-, de-, pre-, and re-; the e in these unstressed syllables is often pronounced [ɪ] or [ə]. (If Rule E11 is not taught in Second Year, this would be an appropriate place to teach it.)

O13: A few of the exemplars of this rule involve the pseudo-prefix pro-. In unstressed syllables the o may be pronounced [ə].

A13: See Rule A22 (18,3) for a in the environment /__rV.

U13: See 6,2 for comments on the pronunciation of [(y)u]. In some words, U13 in the environment /__r may be pronounced [(y)ə], e.g., jury.

18,2: S20: s → [z] /V__V, e.g., nose

S21: $s \rightarrow [s] \; / \left\{\begin{matrix} a \\ ea \\ oo \\ ou \end{matrix}\right\}$ __e, e.g., base, grease, goose, house

Rules S20 and S21 are closely related to general primary vowel Rules 11 and 13 in that they involve the pronunciation of s between two vowels. However, they are especially unstable rules, both having numerous exceptions, in which the opposite correspondence holds.

S20: This rule applies when either V is a primary vowel (including y and silent e) or a secondary vowel. For a few words, Rule S20 applies when the word is used as a verb, but the [s] pronunciation is found when used as a noun or adjective, e.g., use, abuse, close.

S21: Rule S21 presents four special environments where Rule S20 does not apply. However, the rule does not work too well in the environment /ea__e, where there are a number of exceptions pronounced with [z] (Rule S20).

(Since Rule S21 involves the most common pronunciation of s ([s]), it could be sequenced along with Rule S10 (1,3). Then when S20 is taught, the environment for S21 could be specified.)

18,3: A22: *a* → [e], [ɛ], [æ] /__r, e.g., *carry*

This rule applies in three environments:

1. /__CV, e.g., *vary*. This is the same environment as for A13, under which the present exemplars could be subsumed. However, they have been placed here because their pronunciation is the same as in the following environment, in most dialects. In dialects where pronunciation differs (e.g., *Mary* [e] and *marry* [æ] contrast), these words must be coded A13.
2. /__rr, e.g., *arrow*. Rule A22 is particularly needed for this environment which differs from Rule A21 (9,1).
3. Other: The only examples in this category are *scarce* and *scarcely* which can be considered as exceptions to Rule A21 (9,1).

Note should be made here--as with all cases involving *r*--of considerable dialect variation.

(If Rule A25 is not taught in Second Year, this would be an appropriate place to introduce it.)

18,4: O25: *o* → [o] /__#, e.g., *go*

This rule is similar to Rules E25 and Y19 (3,1), in that the long-vowel sound corresponds to a letter in final position. However, Rule O25 applies in words of any length and has no exceptions.

The following are correspondences for other final vowels:

a → [a] /__# in stressed syllables, primarily one-syllable words, e.g., *ha*. See Volume II, Section III.

a → [ə] /__# unstressed in most words of two or more syllables, e.g., *comma*. See Rule A17 (10,1).

i → [i] /__#, e.g., *ski*, *taxi*. See Rule I35 (23,2).

u → [(y)u] /__#, e.g., *flu*, *menu*. See Volume II, Section III.

Block 19 (Silent letters)

Frequency = 287

Unit 1:	Three-syllable words with suffixes: -ment (23), -or (14), -ive (14), -ness (12) -ance/-ant (18)	Frequency = 81
Unit 2:	1E11 (8), 124 + GH10 (60), GH10 (13), H20 (7)	Frequency = 88
Unit 3:	K20 (26), G20 (9), W20 (24)	Frequency = 59
Unit 4:	B20	Frequency = 13
Unit 5:	L20 (21), T20 (19)	Frequency = 40
Unit 6:	U20	Frequency = 6

Block 19 introduces three-syllable words with suffixes, and completes the introduction of single consonant correspondences by presenting "silent letters" (generally indicated by a rule numbered "20"), that is, those grapheme units which do not have a corresponding pronunciation (lack of pronunciation is indicated by Ø). In 19,2 the position of the grapheme units varies; in 19,3 they are initial; in 19,4, final; in 19,5 and 19,6, medial.

19,1: Three-syllable words with suffixes: -ment, -or, -ive, -ness, -ance/-ant.

-ment → [mənt], e.g., agreement

-or → [ər], e.g., inventor

-ive → [ɪv], e.g., attractive

-ness → [nɪs] or [nəs], e.g., eagerness

-ance/-ant → [əns]/[ənt], assistance, assistant

-ment: The ending -ment may occur as a pseudo-suffix, e.g., department

-or: The agent suffixes -or and -er (9,2) have the same meaning and pronunciation.

-ive: Words ending in -d(e), change to -s (pronounced [s]) when adding -ive, e.g., exclude, exclusive (cf, 21,3).

-ness: When adding -ness, final unstressed -y (Y17) changes to -i, also pronounced [i], e.g., happy, happiness.

-ance/-ant: These two suffixes (also, pseudo-suffixes) are grouped together because of their phonological and orthographical similarity, and because they are both often added to the same bases. Commonly, especially when the base ends in [t] or [d], a syllabic [n] ([n̩] is used instead of [ən], thus [n̩s]/[n̩t].

19,2: IE11: ie → [ay] /__#, e.g., die

I24 + GH10: i → [ay] /__gh, e.g., high

GH10: gh → Ø, e.g., bough

H20: h → Ø, e.g., hour

This unit begins with two cases of the [ay] pronunciation, Rules IE11 and I24 + GH10. It then covers other examples of silent gh and concludes with silent h.

IE11: This rule applies generally in one-syllable words and in compounds, that is, when stressed. (For unstressed final ie, see Rule IE17; medial ie is covered by Rule IE12. Both of these rules are introduced in Block 26.)

I24 + GH10: In the present set of correspondences, igh is treated as i plus silent gh (see below). However, it could be treated as one grapheme unit: igh → [ay]. There are no exceptions to this correspondence.

GH10: This is the major correspondence for gh. The exceptions are:

gh → [g] /#__, e.g., ghost;

gh → [g] medially and finally in a few words, e.g., spaghetti;

gh → [f] in about ten words, primarily finally, e.g., laugh.

H20: This rule includes a group of exceptions (a), plus two regular, but minor, rules (b and c):

a. h → Ø /#__, e.g., hour;

b. h → Ø /__#, e.g., pooh;

c. h → Ø /__$V_{\text{unstressed}}$, e.g., graham.

In speech, rule (c) also applies to unstressed function words, e.g., hit him → [hɪ́tɪm] (= hit 'im).

19,3: K20: k → Ø /#__n, e.g., knee

G20: g → Ø /$\left\{\begin{matrix}\#\_\_n \\ \_\_n\#\end{matrix}\right\}$, e.g., gnat, sign

W20: w → Ø /#__r, e.g., write

K20: This invariant rule is a result of English phonotactics, which does not allow initial [kn].

G20: This invariant rule is also a result of English phonotactics, which does not allow initial or final [gn]. The environment /#__n is the same as for Rule K20 ([g] is the voiced counterpart of [k]). When the environment is /__n#, a preceding i is governed by Rule 122 (introduced in 13,3):

$\underline{i} \rightarrow [ay] / \_\_gn\#$, e.g., sign.

W20: This invariant rule is also the result of English phonotactics, which does not allow initial [wr].

19,4: B20: $\underline{b} \rightarrow \emptyset / m\_\_\#$, e.g., bomb

This invariant rule, like those in 19,3, is a result of modern English phonotactics, which does not allow final [mb].

19,5: L20: $\underline{l} \rightarrow \emptyset / \left\{\begin{matrix} o\_\_k \\ a\_\_k \\ a\_\_f \\ a\_\_v \\ a\_\_m \end{matrix}\right\}$, e.g., yolk, walk, half, salve, palm

T20: $\underline{t} \rightarrow \emptyset / \left\{\begin{matrix} s\_\_le \\ s\_\_en \\ f\_\_en \end{matrix}\right\} \#$, e.g., castle, listen, often

While rules L10 and T20 appear to be invariant, the [l] and the [t] are heard in many words (e.g., calm, often), due to spelling pronunciation.

L20: In addition to Rule L20, Rules O23 and A23 (13,2) apply to the sequences olk and alk, respectively. Many exemplars of the sequence alm are irregular because of the following minor rule: $\underline{a} \rightarrow [a] / \_\_lm$, e.g., palm.

T20: Note the alternation between forms ending in t(e) (→[t]) and those ending with the suffix -en: fast/fasten, haste/hasten, soft/soften.

19,6: U20: $\underline{u} \rightarrow \emptyset / \#g\_\_$, e.g., guess

The u here is a marker to indicate the [g] pronunciation of g.

Block 20 (Consonant digraphs; Double consonants)

Frequency = 119

Unit 1: Three-syllable words with suffixes:
-y (12), -ful (8), -al((7), -able (6),
-eth (5), -less (4), -ist (4), -ish (2) Frequency = 48

Unit 2: PH10 (19), CH31 (20) Frequency = 39

Unit 3: TH12 Frequency = 26

Unit 4: CC11 Frequency = 6

Block 20 continues the introduction of three-syllable words and concludes the introduction of double consonants and consonant digraphs.

20,1: Three-syllable words with suffixes: -y, -ful, -al, -able, -eth, -less, -ist, -ish

-y → [i] (Rule Y17; 9,2), e.g., injury

-ful → [fʊl] (Rule U31; 13,1) or [fəl] (Rule U17; 10,1), e.g., colorful

-al → [əl], e.g., musical

-able → [əbəl], e.g., suitable

-eth → [ɪθ], e.g., fortieth

-less → [lɪs] or [ləs], e.g., odorless

-ist → [ɪst], e.g., organist

-ish → [ɪš], e.g., yellowish

-eth: The suffix -eth is a variant of the ordinal-number suffix -th (as in fourth) and is added to numbers ending in a vowel. The only vowel to which this applies is y (Y17: [i]) which changes to i [i] (Rule I36; 25,3) before -eth, e.g., twentieth.

20,2: PH10: ph → [f], e.g., phone

CH31: ch → [k], e.g., school

PH10: This is an invariant correspondence.

CH31: While often unpredictable, this correspondence always holds in the following environment: $/\#\_\_\left\{\begin{matrix} r \\ l \end{matrix}\right\}$, e.g., chrome, chlorine. The correspondence is generally applicable in more common words with the environment /#s__, e.g., school. However, in a number of less common words (generally of German origin) the correspondence for sch is [š], e.g., schwa.

20,3: TH12: th → [ð] $/\_\_\left\{\begin{matrix} \text{e} \\ \text{er} \\ \text{ern} \end{matrix}\right\}$ #, e.g., breathe, gather, northern

Note the alternation between [θ] (Rule TH11; 3,2) and [ð] in such pairs as wrath/rather, north/northern; this may be an automatic phonological change. Note also the alternation between short vowel plus [θ] and long vowel plus [ð] in such pairs as bath/bathe, breath/breathe; this is a grammatical alternation: nouns versus verbs.

The following correspondences apply with TH12:

o → [ə] /__ther (Rule O31), e.g., brother;

ea → [ɛ] /__ther (Rule EA31), e.g., weather.

20,4: CC11: cc → [ks] $/\_\_\left\{\begin{matrix} e \\ i \end{matrix}\right\}$, e.g., success, accident

This rule was not used in Berdiansky et al. (1969), where words were coded C12, C11. (If Rules CC12 and GG10 are not taught in Second Year, this would be an appropriate place to introduce them.)

Block 21 (Palatalizations)

Frequency = 177

Unit 1: Three-syllable words with prefixes: un- (19), re- (6), dis- (5), in- (4), mis- (3) Frequency = 37

Unit 2: -tion Frequency = 81

Unit 3: -sion → [šən] (20), -sion → [žən] (12) Frequency = 32

Unit 4: -ture Frequency = 27

This block concludes the introduction of three-syllable words with affixes. For the first time, selected palatalizations are introduced, in both two- and three-syllable words. (The remaining, minor palatalizations are listed in Volume II, Section V.) Palatalizations are certain spelling-to-sound correspondences which result in the sounds [š], [ž], [č], and [ǰ] and are discussed in greater detail in Cronnell (1971, pp. 33-35). Words with palatalizations were coded "E" in Berdiansky *et al*. (1969). It is suggested that palatalizations be taught by contrasting base and suffixed forms, e.g., promote-promotion, permit-permission, decide-decision. This will promote learning of English phonology, cf, MacDonald (1969), Chomsky (1970).

21,1: Three-syllable words with prefixes: un-, re-, dis-, in-, mis-

un- → [ən], e.g., unbroken

re- → [ri] or [rɪ], e.g., reopen

dis- → [dɪs], e.g., disappear

in- → [ɪn], e.g., inhuman

mis- → [mɪs], e.g., misbehave

21,2: -tion → [šən], e.g., vacation

This is the most common ending involving palatalization in the present lexicon. The suffix is generally only -ion (cf, -ssion and -sion; 21,3), but it is the t which is involved in palatalization, e.g., attract, attraction. (In some words -tion is a pseudo-suffix, e.g., nation.)

As when adding other suffixes beginning with a vowel, the final silent e on a base word is dropped, e.g., translate, translation. For certain base forms, the ending is -ation [éšən], e.g., tempt, temptation. Note that whenever -(t)ion is added to a word, stress is on the syllable preceding the suffix, e.g., dónate, donátion.

In the environment /s__, -tion is pronounced [čən], e.g., suggestion. This is a phonological alternation and may be automatic.

A number of changes may occur in the base when -(t)ion is added. Those found in the present unit are listed below.

A. Long vowel in base word becomes short vowel in suffixed word, sometimes with attendant consonant changes.

1. ai → [e] → e [ɛ] + tion, e.g., detain, detention
2. eive [iv] → ep [ɛp] + tion, e.g., receive, reception
3. ibe [ayb] → ip [ɪp] + tion, e.g., describe, description
4. u [u] → u [ə] + tion, e.g., reduce, reduction. (The pronunciation of c changes from [s] to [k]--Rule C11 to C12--because of the change in environment.)

B. Other changes

1. d → t /__ion, e.g., intend, intention

2. oi/oy [oy] → u [ə] + ction, e.g., destroy, destruction

21,3: -sion → [šən], e.g., mission, mansion

-sion → [žən], e.g., occasion

The ending -sion has two pronunciations, depending on environment: [šən] and [žən] (cf, the contrast of [s] and [z] in Rules S10 and S20). While -sion is sometimes a pseudo-suffix, e.g., mansion, it generally results from the suffix -ion, e.g., confession (cf, -tion; 21,2). All words in this unit are stressed on the syllable preceding -(s)sion.

All occurrences of -ssion are pronounced [šən]. This ending comes from three sources in the present lexicon:

1. base word ending in ss + ion, e.g., discuss, discussion;
2. base word ending in t + ion → ssion, e.g., permit, permission;
3. base word ending in ede [id] + ion → ession [éšən], e.g., procede, procession (cf, -ive; 19,1).

The ending -sion is pronounced [šən] in the environment /C__, where the consonant is not r, e.g., tension. The pronunciation [žən] for -sion occurs in the environment /V__, e.g., occasion, and in the environment /r__, e.g., excursion. In addition, this pronunciation results from suffixation:

1. Vde [V̄d] + ion → Vsion [V́žən], e.g., conclude, conclusion;
2. ide [ayd] + ion → ision [ížən], e.g., divide, division.

21,4: -ture → [čər], e.g., picture

In the present lexicon, this is the second most frequent ending involving palatalization. Most generally, -ture is a pseudo-suffix, e.g., future, although the regular affix -(t)ure is occasionally found, e.g., moisture, mixture.

Block 22 (Nonaffixed three-syllable words)

Frequency = 324

Unit 1:	Stress pattern 3B	Frequency = 92
Unit 2:	Stress pattern 3A	Frequency = 124
Unit 3:	Stress pattern 3C	Frequency = 89
Unit 4:	Stress pattern 3D	Frequency = 19

Block 22 introduces nonaffixed three-syllable words. Since no new correspondences are used and since the concept of three syllables has been employed previously (17,1; 17,3; 19,1; 20,1; Block 21), what is primarily introduced in this block is new stress patterns. These are important because of their effect on the pronunciation of vowels: vowels in unstressed syllables are pronounced using general primary vowel Rule 17 ([ə], or in the case of y, Rule Y17: [i]), while vowels in stressed syllables are pronounced employing other correspondences. For describing stress, the following symbols are used:

´: primary stress: full pronunciation of the vowel;

`: secondary stress: full pronunciation of the vowel, but with less prominence than for primary stress;

-: unstressed: [ə] as the pronunciation of a, e, i, o, u; [i] as the pronunciation of y.

The difference between primary and secondary stressed vowels is probably not of importance for teaching, so long as they receive their full pronunciation. The main concern is that unstressed vowels should not receive a full pronunciation, but should be pronounced [ə] (or [i] for unstressed y).

Note should be made here that the precise pronunciation of unstressed vowels varies from dialect to dialect, from speaker to speaker, and from word to word. While [ə] is the most common unstressed-vowel sound, [ɪ] and other varieties of vowels may be used. In some words, the pronunciation of unstressed u varies between [ə] and [(y)u], often being pronounced [yə], e.g., formula. With stress pattern 3C, the first vowel in some words may have its full pronunciation, e.g., antenna.

Four stress patterns have been found which are applicable to the three-syllable words in the present lexicon:

22,2: Stress pattern 3A: ´--, e.g., carnival
22,1: Stress pattern 3B: `-´, e.g., hurricane
22,3: Stress pattern 3C: -´-, e.g., umbrella
22,4: Stress pattern 3D: `-´. e.g., kangaroo

Stress patterns 3A and 3B are closely related, the difference being that in 3A the final vowel is unstressed, while in 3B the final vowel has its full form. It may be preferable to consider these patterns as subcategories of one overriding pattern. (Certain words belong to either stress pattern 3A or 3B, depending on form class; e.g., estimate as a verb is 3B [ɛ́stəmèt], as a noun 3A [ɛ́stəmɪt].) In sequencing three-syllable stress patterns, 3B has been placed before 3A because both the first and last vowels of 3B can be pronounced using major, environmentally governed correspondences. It is felt that the two unstressed vowels of 3A will be more difficult than the one of 3B. Otherwise, the criterion for sequencing stress patterns is frequency. Within each unit, stress patterns are ordered on the basis of the spelling-to-sound correspondences for the last vowel.

Fourth Year

(Low-frequency primary and secondary vowels; Four-syllable words; Affixes; Four-syllable stress patterns)

Frequency = 1129

Review Block

It is assumed that Fourth Year will begin with review. However, no specific suggestions are made in this report. Since there are over 3000 exemplars given for Third Year, there should be sufficient material for review.

Block 23 (Specific primary vowel rules)

Frequency = 151

Unit 1:	A29 (29), A24 (43)	Frequency = 72
Unit 2:	I35 (21), I25 (27)	Frequency = 48
Unit 3:	Y11 (8), Y13 (6), Y15 (7), Y16 (10)	Frequency = 31

Blocks 23, 24, and 25 introduce the remaining, minor correspondences for primary vowels (with the exception of general primary vowel Rule 32 in 27,6). In general, specific vowel rules are introduced in Block 23, while Blocks 24 and 25 cover rules generalizable across all vowels (general primary vowel rules).

23,1: A29: $\underline{a} \rightarrow [e] / \_\_ \left\{ \begin{matrix} nge \\ ste\# \end{matrix} \right\}$, e.g., *danger*, *paste*

A24: $\underline{a} \rightarrow [a] / \left\{ \begin{matrix} w \\ qu \end{matrix} \right\} \_\_$, e.g., *wad*, *squat*

This unit includes special rules for the letter *a*.

A29: This is a limited extension of Rule A11. Rule A29 applies even if the *e* is lost from the environment when suffixes are added, e.g., *haste*, *hastily*.

A24: This rule applies only when the following consonant sound is not a velar (i.e., is not [k, g, ŋ]); thus it does apply before *k*, *ng*, *x*, *c* pronounced [k], or *g* pronounced [g]. It also does not apply before *r*, where Rule A25 (9,3) is used. There is a considerable amount of dialect and idiolect variation among exemplars of this rule, with [ɔ] often being used.

23,2: I35: *i* → [i], e.g., *police*

I25: *i* → [y] $/C\_\_V_{unstressed}$, e.g., *junior*

This unit includes special rules for the letter *i*.

I35: This exception rule covers words which were coded as irregular in Berdiansky *et al*. (1969). It is unpredictable except in the environment /__#, where it always holds, e.g., *ski* (with the exception of *I* and *hi*).

I25: In this rule, *i* functions unpredictably as a consonant. The most common environment is $/\left\{\begin{smallmatrix} l \\ n \end{smallmatrix}\right\}\_\_$, e.g., *million*, *onion*.

23,3: Y11: *y* → [ay] /__Ce#, e.g., *type*

Y13: *y* → [ay] /__CV, e.g., *tyrant*

Y15: *y* → [ɪ] /__C(C)#, e.g., *gym*

Y16: *y* → [ɪ] /__CC..., e.g., *system*

General primary vowel Rules 11-16 are applicable to *y*, where the pronunciation is the same as for *i*. Because of low frequency, the *y* rules have been postponed until this unit.

Block 24 (Four-syllable words; Rules for exceptions to general primary vowel Rule 13)

Frequency = 223

Unit 1:	Four-syllable compounds (11); Four-syllable compounds with suffixes: -ing (7), -y (1), -er (6), -or (8), -en (1), -ed (2), -ly (14)	Frequency = 50
Unit 2:	E38 (38), I38 (22), A38 (21), O38 (8)	Frequency = 89
Unit 3:	A28 (19), I28 (17), Y28 (2), O28 (20), E28 (9)	Frequency = 67
Unit 4:	General primary vowel Rule 27	Frequency = 17

Block 24 marks the introduction of four-syllable words. In addition, rules are introduced which provide for exceptions to general primary vowel Rule 13; i.e., rules which provide for $V \rightarrow [\check{V}] / \_\_CV$ (cf, 18,1).

24,1: Four-syllable compounds

Four-syllable words with suffixes: -ing, -y, -er, -or, -en, -ed, -ly. This unit begins the introduction of four-syllable words, which continues in the first unit of each block until Block 27, where they are thoroughly introduced. The sequence and method of introducing four-syllable words is similar to that used for three-syllable words in Third Year. (See 17,2 and 17,3 for comments on suffixes.)

24,2: E38: $e \rightarrow [\varepsilon] / \_\_\left\{\begin{smallmatrix}x\\v\end{smallmatrix}\right\}V$, e.g., Texas, level

I38: $i \rightarrow [\text{ɪ}] / \_\_\left\{\begin{smallmatrix}x\\v\end{smallmatrix}\right\}V$, e.g., river

A38: $a \rightarrow [\text{æ}] / \_\_\left\{\begin{smallmatrix}x\\v\end{smallmatrix}\right\}(l)V$, e.g., axis, axle, cavern

O38: $o \rightarrow [a] / \_\_\left\{\begin{smallmatrix}x\\v\end{smallmatrix}\right\}V$, e.g., oxen, novel

General primary vowel exception Rule 38 is as follows: $V \rightarrow [\check{V}] / \_\_\left\{\begin{smallmatrix}x\\ v\end{smallmatrix}\right\}(l)V$; it does not apply to *u* or *y* for any words in the present lexicon; nor are there exemplars of *i* in the environment $/\_\_xV$. The environment including *l* appears only in one word, *axle*. The rule always works for *x*, which can never be doubled and which functions as a consonant cluster (the CC in general primary vowel Rule 16, which always applies to primary vowels before x). For vowels before *v*, there is considerable variation between Rules 13 and 38 (cf, *evil*, *devil*), and it may be advisable to eliminate this rule for *v*. (Exemplars with *v* could be taught as exceptions to Rule 13; see 18,1.)

24,3: A28: $\underline{a} \rightarrow [æ] / \_\_C\begin{Bmatrix}ic\\ id\\ ish\\ it\end{Bmatrix}$, e.g., *magic*, *rapid*, *radish*, *habit*

I28: $\underline{i} \rightarrow [ɪ] / \_\_C\begin{Bmatrix}ic\\ id\\ ish\\ it\end{Bmatrix}$, e.g., *clinic*, *timid*, *finish*, *limit*

Y28: $\underline{y} \rightarrow [ɪ] / \_\_C\begin{Bmatrix}ic\\ id\\ ish\\ it\end{Bmatrix}$, e.g., *physic*

O28: $\underline{o} \rightarrow [a] / \_\_C\begin{Bmatrix}ic\\ id\\ ish\\ it\end{Bmatrix}$, e.g., *phonics*, *solid*, *abolish*, *profit*

E28: $\underline{e} \rightarrow [ɛ] / \_\_C\begin{Bmatrix}ic\\ id\\ ish\\ it\end{Bmatrix}$, e.g., *relic*, *cherish*, *credit*

General primary vowel Rule 28 is as follows: $V \rightarrow [\check{V}] / \_\_C\begin{Bmatrix}ic\\ id\\ ish\\ it\end{Bmatrix}$.

This rule does not generally apply to *u*. The endings *id*, *ish*, and it are not suffixes, but ic may be and in such cases the base and affixed forms should be contrasted in order to promote learning of English phonology (cf, MacDonald, 1969; Chomsky, 1970). Stress is always on the syllable before the ending, even when the base form is stressed otherwise (e.g., áthlete, athlétic).

An alternative approach to the above sequence is teaching each letter in each environment, i.e.:

V → [V̌] /__C ic

V → [V̌] /__C it

V → [V̌] /__C ish

V → [V̌] /__C id

Y28: The only exemplars of Rule Y28 are in the environment /__C ic.

E28: There are no exemplars of Rule E28 in the environment /C id.

24,4: General primary vowel Rule 27

General primary vowel Rule 27 is as follows: V → [V̌]__C ity, e.g., humanity, ability. Rule 27 could be included in general primary vowel Rule 28 (24,3) but has not, however, since its occurrence involves four-syllable words. In addition, most exemplars of Rule 28 are cases of base plus -ity (→ [əti]), and it is probably appropriate to teach this rule in terms of contrast between the base and suffixed forms to promote learning of English phonology (cf, MacDonald, 1969; Chomsky, 1970). Note that the last vowel in most base forms is unstressed ([ə] or [ɪ]), changing to [V̌] when the suffix is added. As with Rule 28, the syllable before the ending (-ity) is stressed, e.g., moral [mórəl], mórality [morǽləti].

Because of the limited number of exemplars, this rule is not taught by individual letters, but is generalized across letters.

Block 25 (Remaining general primary vowel rules)

Frequency = 240

Unit 1:	Four-syllable words with -tion	Frequency = 61
Unit 2:	I26 (30), Y26 (2), U26 (11), E26 (15), O26 (3), A26 (2)	Frequency = 63
Unit 3:	I36 (35), Y36 (2)	Frequency = 37
Unit 4:	A12 (18), I12 (9), Y12 (2), O12 (2), U12 (2)	Frequency = 33
Unit 5:	E14 (20), I14 (9), Y14 (4), A14 (6), O14 (4), U14 (3)	Frequency = 46

25,1 continues the introduction of four-syllable words. Units 2-5 of Block 25 mainly introduce new rules for the "long" pronunciation of primary vowels. Units 2 and 3 are concerned with the pronunciation of a vowel followed by a vowel, while units 4 and 5 are extensions of the "long-vowel" rules.

25,1: Four-syllable words with -tion → [šən]

Comments applicable to -tion are found in 21,2. It should be noted that primary stress always falls on the syllable before -tion; however, for four-syllable words there is secondary stress on the first syllable. Thus the stress pattern is ˋ-ˊ-, with unstressed vowels in the second and last syllables. These stress considerations may cause sizable pronunciation differences between base and suffixed forms (e.g., console [kənsól], consolation [kànsəléšən]), which should be contrasted when teaching palatalizations.

Within this unit there are two cases of exceptions to general primary vowel Rule 13:

a. the ending -ition pronounced [íšən];

b. the first vowel having a "long" sound in the base, but a "short" sound in the suffixed form, e.g., recite, recitation.

25,2: I26: i → [ay] /__-V, e.g., lion
Y26: y → [ay] /__-V, e.g., hyena
U26: u → [(y)u] /__-V, e.g., duet
E26: e → [i] /__-V, e.g., create
O26: o → [o] /__-V, e.g., poet
A26: a → [e] /__-V, e.g., mosaic

This unit introduces general primary vowel Rule 26: V → [V̄] /__-V. The hyphen indicates syllable division, to differentiate two separate vowels from a secondary vowel. In many cases where this rule applies, there is no possibility of confusion with secondary vowels; e.g., the sequence io is never a secondary vowel and must always be treated as two primary vowels, as in riot. However, in some cases a vowel sequence may be either a secondary vowel or two primary vowels, cf, the ea in sea [i] and area [iə]. In such cases, there is no way to determine which is the correct interpretation except by trial and error.

The vowel following a Rule 26, in most words, is unstressed [ə], e.g., riot [ráyət], area [ériə].

I26: This rule should be compared with Rule I25, where the i is pronounced [y], e.g., million.

Y26: This rule is another case of the applicability of general primary vowel rules to y, which has the same pronunciation as i.

25,3: I36: i → [i] /__-V, e.g., Indian

Y36: y → [i] /__-V, e.g., embryo

These exception rules have the same environment as Rules I26 and Y26, but a different pronunciation.

I36: Cf, Rule I35 (23,2) which has the same pronunciation.

25,4: A12: a → [e] $/\_\_C\left\{\begin{smallmatrix}r\\l\end{smallmatrix}\right\}e\#$, e.g., table

I12: i → [ay] $/\_\_C\left\{\begin{smallmatrix}r\\l\end{smallmatrix}\right\}e\#$, e.g., title

Y12: y → [ay] $/\_\_C\left\{\begin{smallmatrix}r\\l\end{smallmatrix}\right\}e\#$, e.g., cycle

O12: o → [o] $/\_\_C\left\{\begin{smallmatrix}r\\l\end{smallmatrix}\right\}e\#$, e.g., noble

U12: u → [(y)u] $/\_\_C\left\{\begin{smallmatrix}r\\l\end{smallmatrix}\right\}e\#$, e.g., bugle

This unit introduces general primary vowel Rule 12: $V \rightarrow [\bar{V}] /\_\_C\left\{\begin{smallmatrix}r\\l\end{smallmatrix}\right\}e\#$, which is an extension of Rule 11 (Block 6), with r or l between the consonant and the final e. The environment /__Cre# occurs only if the consonant is g or c, when er would indicate the G11 or C11 pronunciations rather than the desired G12 or C12. The only examples of this in the present lexicon are acre and ogre, where re is pronounced [ər] and is thus irregularly-spelled (see Volume II, Section III).

The rule apparently has no exemplars with e.

25,5: E14: e → [i] $/\_\_C\left\{\begin{smallmatrix}r\\l\end{smallmatrix}\right\}V$, e.g., secret, cathedral

I14: i → [ay] $/\_\_C\left\{\begin{smallmatrix}r\\l\end{smallmatrix}\right\}V$, e.g., library, biplane

Y14: y → [ay] $/\_\_C\left\{\begin{smallmatrix}r\\l\end{smallmatrix}\right\}V$, e.g., hydrant, cyclone

A14: a → [e] / $\_\_C\begin{Bmatrix}r\\l\end{Bmatrix}V$, e.g., April

O14: o → [o] / $\_\_C\begin{Bmatrix}r\\l\end{Bmatrix}V$, e.g., okra, only

U14: u → [(y)u] / $\_\_C\begin{Bmatrix}r\\l\end{Bmatrix}V$, e.g., lubricate, duplicate

This unit introduces general primary vowel Rule 14: V → [$\bar{V}$] / $\_\_C\begin{Bmatrix}r\\l\end{Bmatrix}V$, which is an extension of Rule 13 (18,1) and is similar to Rule 12 (23,4).

E14: In unstressed syllables, this may be pronounced [ɪ] or [ə].

A14: There are no exemplars of this rule in the environment /__ClV.

Block 26 (Low-frequency secondary vowel rules)

Frequency = 311

Unit 1:	Four-syllable words with suffixes: -able (19), -ment (5), -al (8), -ness (2), -ary (2), -ist (1)	Frequency = 37
Unit 2:	IE17 (12), EY17 (23)	Frequency = 35
Unit 3:	AI17	Frequency = 10
Unit 4:	EA33	Frequency = 18
Unit 5:	IE12 (39), EI10 (15)	Frequency = 54
Unit 6:	EY10 (9), EI20 (19)	Frequency = 28
Unit 7:	-ous (38), OU31 (26), OU35 (27), OU33 (19), OU34 (11)	Frequency = 121
Unit 8:	UI31	Frequency = 8

This block continues the introduction of four-syllable words and concludes the teaching of secondary vowel rules.

26,1: Four-syllable words with suffixes: -able, -ment, -al, -ness, -ary, -ist

See 19,1 and 20,1 for discussion of these suffixes.

26,2: IE17: ie → [i] /__# in unstressed syllables, e.g., hippie

EY17: ey → [i] /__# in unstressed syllables, e.g., honey

Both rules in this unit occur in unstressed syllables in word-final position. Both are pronounced the same: [i] (or [ɪ], particularly in connected speech). Both, but especially IE17, are common in proper names (see Volume II, Section IV).

IE17: For stressed final ie see Rule IE11 (19,2). Medial ie is Rule IE12 (26,5).

EY17: Stressed ey is covered by Rule EY10 (26,6).

26,3: AI17: ai → [ə] in unstressed syllables, e.g., villian

All exemplars of this rule are in the environment /__n#. As with general primary vowel Rule 17, pronunciation varies between [ə] and [ɪ]. In many cases, a vowel is not pronounced, leaving a syllabic [n], e.g., mountain [máwntn̩].

26,4: EA33: ea → [ə] /__r, e.g., earn

This is an exception rule, in that Rules EA11 and EA31 (12,2) are regularly found before r, e.g., hear, bear. Rule EA33 groups together all cases of ear pronounced [ər], [ɚ]), e.g., heard.

26,5: IE12: ie → [i] /...__..., e.g., field

EI10: ei → [i], e.g., seize

Both rules have the same pronunciation ([i]) and occur only medially.

IE12: Final ie is covered by Rules IE11 (19,2) and IE17 (26,2). In addition, the sequence ie may be a combination of i and e, e.g., diet (see Rule I26 in 25,2).

EI10: The other pronunciation of ei is covered by Rule EI20 (26,6) with which EI10 could be contrasted.

26,6: EY10: ey → [e], e.g., they

EI20: $ei \rightarrow [e] \; / \_\_ \begin{Bmatrix} gh \\ gn \\ n \end{Bmatrix}$, e.g., weigh, reign, vein

These two rules have the same pronunciation, and are in complementary distribution, EY10 occurring finally and EI20 occurring initially and medially.

EY10: This rule applies in stressed syllables, primarily in one-syllable words. Unstressed ey is covered by Rule EY17 (26,2). The only exceptions to this rule are key and eye and their derivatives.

EI20: For words with the environment /__gh, the gh is always silent (GH10 in 19,2). The environment /__n does not necessarily specify this rule, cf, protein, EI10 (26,5).

26,7: -ous → [əs], e.g., dangerous

OU31: ou → [ə], e.g., touch

OU35: ou → [o], e.g., though

OU33: ou → [u], e.g., soup

OU34: ou → [ɔ], e.g., fought

This unit introduces the many remaining pronunciations of ou, the major one, OU10, having already been taught (16,2). Rule OU31 governs the pronunciation of the -ous ending, which is presented first because of its high frequency and consistency. Burmeister (1968) found OU31 to be the most frequent rule for ou in a 20,000 word corpus, due primarily to this ending.

-ous: The ending -ous is both a suffix and a pseudo-suffix, e.g., joyous, jealous.

OU31: The sequence our is pronounced [ər] ([ɚ]), e.g., courage.

OU35: All but one of the exemplars of this exception rule are in the environments $/\_\_\left\{\begin{matrix}gh\\r\\l\end{matrix}\right\}$. The pronunciation of our is variable, e.g., four.

OU33: The pronunciation [yu] seems not to occur for this rule, except variably in coupon.

OU35: All exemplars of this exception rule occur only in the environment /__ght. The gh is silent (Rule GH10) and ought could be taught as a grapheme unit pronounced [ɔt]. In some dialects [a] is the pronunciation for this rule.

26,8: UI31: ui → [ɪ], e.g., built

All exceptions to Rule UI10 (16,6) are covered by this rule. The words are either build and its derivatives, or cases of unstressed ui, e.g., biscuit.

Block 27 (Four-syllable words; General primary vowel Rule 32)

Frequency = 204

Unit 1: Four-syllable words with prefixes: un- (8), in- (6), dis- (3), mis- (2) Frequency = 19

Unit 2: Stress pattern 4A (59), Stress pattern 4B (10) Frequency = 69

Unit 3: Stress pattern 4C Frequency = 23

Unit 4: Stress pattern 4D Frequency = 14

Unit 5: Other four-syllable words Frequency = 7

Unit 6: E32 (49), O32 (13), A32 (7), I32 (3) Frequency = 72

Block 27 concludes the introduction of four-syllable words and introduces general primary vowel Rule 32.

27,1: Four-syllable words with prefixes: un-, in-, dis-, mis-,

See 21,1 for discussion of these prefixes.

27,2; 27,3; 27,4; 27,5: Four-syllable words

These units introduce nonaffixed four-syllable words. Since no new correspondences are used and since the concept of four syllables has been employed previously (24,1; 24,4; 25,1; 26,1; 27,1), what is primarily introduced in this block is new stress patterns. See Block 22 for discussion of stress, stress symbols, and unstressed vowels and their pronunciation.

Four stress patterns have been identified which are applicable to the four-syllable words in the present lexicon:

27,2: Stress pattern 4A: -’--, e.g., asparagus

Stress pattern 4B: -`-’, e.g., abbreviate

Stress pattern 4A and 4B are closely related, the difference being that in 4A the final vowel is unstressed, while in 4B the final vowel has its full form. It may be preferable to consider these patterns as subclasses of one overriding pattern.

27,3: Stress pattern 4C: `-’-, e.g., tonsilitis

27,4: Stress pattern 4D: ’-`-, e.g., alligator

27,5: Other four-syllable words

This is a small set of words with miscellaneous stress patterns:

´---, e.g., accuracy

´--`, e.g., meteorite

`--´, e.g., marionette

27,6: E32: e → Ø, e.g., difference

032: o → Ø, e.g., history

A32: a → Ø, e.g., separate (Aj)

I32: i → Ø, e.g., aspirin

There are a number of words where a graphemic medial vowel is not generally pronounced (V → Ø), although an alternate pronunciation with the vowel (unstressed, pronounced [ə]) is usually possible, even if over-precise. These unpronounced vowels are coded as general primary vowel Rule 32. Very often they are in the environment /__r, e.g., every.

This unit includes potential three-syllable words reduced to two syllables and potential four-syllable words reduced to three syllables.

There are no exemplars of general primary vowel Rule 32 for u or y.

E32: Many of the exemplars of Rule E32 have unpronounced e in the ending -ery (→ [ri]), e.g., scenery. Very often this results when -y is added to a base ending in -er, silver [sílvər], silvery [sǐlvri].

APPENDIX A

Key to Pronunciation and Symbols

Key to Pronunciation

The following phonetic symbols are used to indicate pronunciation. The symbols used in *Webster's New World Dictionary* (1957) are given on the right for reference.

Symbol	Key words (corresponding graphemes underlined)	Dictionary Symbol
Vowels		
[i]	scene, neat, see, chief	ē
[ɪ]	bit, hidden	i
[e]	name, day, they	ā
[ɛ]	get, head	e
[æ]	fat, bad	a
[a]	hot, car	o
[ɔ]	song, loss, taught, lawn, talk, ball, thought	ô
[o]	bone, go, fork, toe, board, know	ō
[ʊ]	put, push, book, could	oo
[u]	food, dew, tune	o͞o
[ə]	but, above	(unstressed) ə (stressed) u
[ay]	cry, mine, die	ī
[aw]	found, owl	ou
[oy]	boy, noise	oi

Symbol	Key words (corresponding graphemes underlined)	Dictionary Symbol
Consonants		
[b]	boy, cab	b
[č]	church, chip, hatch	ch
[d]	dead, do	d
[f]	fun, fair, off	f
[g]	go, gay, egg	g
[h]	home, head	h
[ǰ]	judge, gem, age	j
[k]	kill, kick, come, cat	k
[l]	let, little	l
[m]	man, ham	m
[n]	no, hand	n
[ŋ]	sing, single, think	ŋ
[p]	pull, trip	p
[r]	red, far	r
[s]	see, ice, miss	s
[š]	she, sure, issue, nation, hash	sh
[t]	ten, hit, liked	t
[v]	vase, love	v
[w]	wet, language, quick	w
[y]	yet, you	y
[z]	zoo, lazy, please, wives	z
[ž]	vision, treasure	zh
[θ]	thing, bath	th
[ð]	them, bathe	*th*

Key to Symbols

Parts of speech

Aj = adjective

N = noun

Vb = verb

Other symbols

P = alternate pronunciation (e.g., for either, route)

AS = alternate stress pattern (e.g., for invalid), generally also involving an alternate pronunciation (P)

ɇ = a final silent e (Rule E18) which is dropped when adding a suffix (e.g., hīde, hiding)

V = vowel

C = consonant

Ø = silent letter

Symbols used in stating rules of correspondence are described in Berdiansky, Cronnell, and Koehler (1969, pp. 14-15). Additionally, in the present report, the arrow (→) is sometimes used to represent a orthographic change: e.g., y → i + ly (i.e., y becomes--is changed to--i when ly is added, e.g., happy, happily).

APPENDIX B

GLOSSARY

AFFIX: a nonfree form added to a word to make a new word, e.g., the un- in unfair, the -s in boys. Affixes include both prefixes and suffixes.

BASE (WORD): a word to which an affix is added forming a new word; e.g., boy is the base in boys.

BISYLLABLE: a two-syllable word.

COMPOUND: a word composed of two (or more) words, e.g., goldfish, houseboat.

COMPLEMENTARY DISTRIBUTION: a situation in which two sounds or two grapheme units do not contrast in the same environment and are thus classed together. E.g., in English aspirated [t^h] and unaspirated [t] are in complementary distribution, since the former occurs initially, while the latter never does. The grapheme units oi and oy are in complementary distirubtion since the former occurs only initially and medially, while the latter generally occurs only finally.

CONSONANT DIGRAPH: a grapheme unit composed of two or more consonant letters, e.g., th, ck, qu.

CONSONANT CLUSTER: a series of two or more consonant grapheme units, e.g., spr, nch, nk. Also called a consonant blend.

DIALECT: the way a language is spoken (or written) by any group of speakers. Dialects may be based on geographical, social or ethnic differences, but the term does not indicate any value judgment. The dialect used in this activity is known as "General American," a somewhat vague term for the type of English most commonly spoken in the United States.

DIGRAPH: a two-letter grapheme unit, e.g., ch, oa. This term is generally applied to consonants, vowel digraphs being called secondary vowels.

DOUBLE CONSONANT: a grapheme unit composed of two occurrences of the same consonant, e.g., dd, ll. Because of English phonotactics, most spelled double consonants are pronounced the same as a single consonant, e.g., d → [d], dd → [d]. Because of environmental constraints on c and g, this does not completely apply to cc and gg; nor does it apply to words containing morpheme boundaries, e.g., dd → [dd] in midday. The term "geminate" is sometimes used when describing double consonants.

ENVIRONMENT: other letters or sounds in a word which affect a spelling-to-sound correspondence. Indicated by a slash (/) and by underlining in the position of the correspondence. E.g., the environment /__r means that the correspondence occurs when the grapheme unit is followed by r.

EXCEPTION: a grapheme unit in a word for which no (listed) spelling-to-sound correspondence is applicable. Words containing exceptions are also called exceptions. Since such exceptions were coded "40," the words are sometimes known as "*40* words." The term "irregular" refers to exceptions.

EXEMPLAR: a word containing a particular spelling-to-sound correspondence.

40 WORDS: see EXCEPTION.

GEMINATE CONSONANTS: see DOUBLE CONSONANTS.

GRAPHEME: a unit of an alphabet; a letter. For English, any of the 26 letters.

GRAPHEME UNIT: one of more letters (graphemes) functioning as a unit in deriving spelling-to-sound correspondences, e.g., *a*, *t*, *mm*, *oy*, *th*, *qu*. Whatever is on the left-hand side of a rule of correspondence is a grapheme unit.

GRAPHOTACTICS: restrictions on the combination of letters and grapheme units in a particular language; e.g., *x* is never doubled and *q* is always followed by *u* in English. Some graphotactic restrictions are the result of phonotactic restrictions; e.g., no English word can begin with *ft*. Cf, PHONOTACTICS.

IRREGULAR: see EXCEPTIONS.

LONG VOWELS: the sounds [e, i, ay, o, (y)u].

MONOSYLLABLE: a one-syllable word.

MULTISYLLABLE: a word of two or more syllables.

ORTHOGRAPHY: the spelling system of a language.

PALATALIZATION: the process which accounts for many occurrences of the palatal sounds [š, ž, č, ǰ] as in *nation*, *vision*, *nature*, *gradual*. While this is basically a phonological process, it is also used to describe certain spelling-to-sound correspondences.

PHONOLOGY: the sound system of a language.

PHONOTACTICS: restrictions on the combination of sounds in a particular language; e.g., no word in English can begin with [ft]. Cf, GRAPHOTACTICS.

POLYSYLLABLE: a word of three of more syllables.

PRIMARY VOWEL: a grapheme unit composed of a single vowel letter, i.e., *a*, *e*, *i*, *o*, *u*, *y*.

PSEUDO-AFFIX: commonly recurring word parts which look like suffixes and prefixes, but which do not act as such grammatically and semantically, e.g., the com [kəm] in commit, communion, and communicate. In general, pseudo-affixes were historically affixes (e.g., Latin com- < cum 'with'), but they have lost their independent status. In some cases, true affixes and pseudo-affixes share the same form, e.g., rename/repair, re-form ('form again')/reform.

RULES OF CORRESPONDENCE: see SPELLING-TO-SOUND CORRESPONDENCE.

SECONDARY VOWEL: a grapheme unit composed of two (or more) vowel letters, e.g., ee, oa, ay. Also called "vowel digraph."

SHORT VOWELS: the sounds [æ, ɛ, ɪ, a, ə].

SILENT LETTER: a letter in a word for which there is no corresponding sound in the pronunciation of the word (symbolized by Ø) Some silent letters mark the pronunciation of other letters, e.g., the e in name; some are graphotactic devices, e.g., the e in have; some are anachronisms or scribal inventions, e.g., the gh in bough, the b in debt.

SPELLING-TO-SOUND CORRESPONDENCE: the relationship between the spelling and pronunciation of a grapheme unit. Also called spelling-to-sound correspondence rules and rules of correspondence (rules, for short).

STRESS: the degree of prominence found on a syllable. The basic distinction is spelling-to-sound correspondences in between stressed (marked ´ over a vowel) and unstressed (unmarked) syllables. In polysyllabic words it is useful to recognize two levels of stress: primary (´) and secondary (ˋ), e.g., accómmodàte. Stress is sometimes called accent.

SYLLABLE: a segment of speech containing one vowel sound and optional consonant sounds. (In addition, certain consonant sounds may be syllabic).

SYLLABLE DIVISION: the division between two syllables. Phonologically this is a disputed and unclear matter in English. Orthographically, syllable division is regulated by dictionaries and printers manuals. In this report, syllable division is indicated only in clear-cut cases when necessary for interpretation of the rules of correspondence.

VOICE: vibration of the vocal chords during speech. All vowels are voiced (i.e., have voice), as are the following consonants: [b, d, g, v, ð, z, ž, ǰ, m, n, ŋ, r, l, w, y]. The voiceless consonants [p, t, k, f, θ, s, š, č, h] are produced without vibration of the vocal chords. The voiced/voiceless distinction is of particular importance in the pronunciation of the -s and -ed suffixes.

APPENDIX C

Spelling-to-Sound Correspondences: Rule Description, Exemplars, Position in Sequence

Spelling-to-sound correspondences for primary vowels

Grapheme Unit	Rule #[9]	Rule Description	Examples	Position in sequence
A	11	$a \rightarrow [e] / \_\_Ce\#$	name, brave	6,1
	12	$a \rightarrow [e] / \_\_C\left\{\begin{smallmatrix} r \\ l \end{smallmatrix}\right\}e\#$	acre, stable	25,4
	13	$a \rightarrow [e] / \_\_CV$	baby, nature	18,1
	14	$a \rightarrow [e] / \_\_C\left\{\begin{smallmatrix} r \\ l \end{smallmatrix}\right\}V$	April, fragrant	25,5
	15	$a \rightarrow [æ] / \_\_C(C)\#$	sat, fast	1,1
	16	$a \rightarrow [æ] / \_\_CC....$	saddle, jacket	8,2
	17	$a \rightarrow [ə], [ɪ]$ in unstressed syllables	above, final	10,1
	21	$a \rightarrow [a] / \_\_\left\{\begin{smallmatrix} rC \\ r\# \end{smallmatrix}\right\}$	cart, car	9,1
	22	$a \rightarrow [ɛ], [æ] / \_\_r$	vary, marry	18,3
	23	$a \rightarrow [ɔ] / \_\_ \left\{\begin{matrix} ll \\ lk \\ lt \\ ld \end{matrix}\right\}$	ball, walk, salt, bald	13,2
	24	$a \rightarrow [a], [ɔ] / \left\{\begin{smallmatrix} w \\ u \end{smallmatrix}\right\}\_\_$	wad, squat	23,1
	25	$a \rightarrow [o] / \left\{\begin{matrix} wh \\ w \\ qu \end{matrix}\right\} \_\_r$	wharf, war, quart	9,3

---

[9] For further description of these rules and of the rule notation, see Berdiansky, Cronnell and Koehler (1969), Cronnell (1971), and Section III of this report. Asterisked rules do not appear in the earlier reports.

Grapheme Unit	Rule #	Rule Description	Examples	Position in sequence
A	26*	a → [e] /__-V	mosaic	25,2
	27*	a → [æ] /__ C ity	humanity, capacity	24,4
	28*	a → [æ] /__C $\left\{\begin{matrix}\text{ic}\\ \text{id}\\ \text{ish}\\ \text{it}\end{matrix}\right\}$	magic, rapid, radish, habit	24,3
	29	a → [e] /__$\left\{\begin{matrix}\text{nge}\\ \text{ste\#}\end{matrix}\right\}$	strange, paste	23,1
	32	a → Ø	separate	27,6
	38	a → [æ] /__ $\left\{\begin{matrix}\text{vV}\\ \text{x(l)V}\end{matrix}\right\}$	cavern, axis axle	24,2
E	11	e → [i] /__Ce#	scene, here	6,2
	13	e → [i] /__CV	hero, meter	18,1
	14	e → [i] /__C$\left\{\begin{matrix}\text{r}\\ \text{l}\end{matrix}\right\}$V	zebra, declare	25,5
	15	e → [ɛ] /__C(C)#	set, felt	1,4
	16	e → [ɛ] /__CC....	edge, extra	8,2
	17	e → [ə], [ɪ] in unstressed syllables	hidden, talent, magnet	10,1
	18	e → Ø /__#	name, edge, immense, mice	6,1
	19	e → Ø /__$\left\{\begin{matrix}\text{s}\\ \text{d}\end{matrix}\right\}$	armed, wives	---[10]
	21	e → [ə] /__$\left\{\begin{matrix}\text{rC}\\ \text{r\#}\end{matrix}\right\}$	herd, father	9,1
	25	e → [i] /#(C)C__#	we, she	3,1
	26	e → [i] /__-V	create, meow	25,2
	27*	e → [ɛ] /__ C ity	prosperity	24,4

---

[10] Not taught explicitly as a correspondence rule.

Grapheme Unit	Rule #	Rule Description	Examples	Position in sequence
E	28*	$e \rightarrow [\varepsilon]\ /\ \_\_C \begin{Bmatrix} ic \\ id \\ ish \\ it \end{Bmatrix}$	relic, cherish credit	24,3
	32	$e \rightarrow \emptyset$	difference, several	27,6
	38	$e \rightarrow [\varepsilon]\ /\ \_\_\begin{Bmatrix} vV \\ x(l)V \end{Bmatrix}$	clever, exit	25,2
I	11	i → [ay] /__Ce#	fine, like	6,1
	12	$i \rightarrow [ay]\ /\ \_\_C\begin{Bmatrix} r \\ l \end{Bmatrix}e\#$	title, idle	25,4
	13	i → [ay] /__CV	pilot, cider	18,1
	14	$i \rightarrow [ay]\ /\ \_\_C\begin{Bmatrix} r \\ l \end{Bmatrix}V$	migrate, idly	25,5
	15	i → [ɪ] /__C(C)#	sit, milk	1,1
	16	i → [ɪ] /__CC....	hidden, little	8,2
	17	i → [ə], [ɪ] in unstressed syllables	missile, office	10,1
	21	$i \rightarrow [ə]\ /\ \_\_\begin{Bmatrix} rC \\ r\# \end{Bmatrix}$	bird, sir	9,1
	22	$i \rightarrow [ay]\ /\ \_\_\begin{Bmatrix} nd \\ ld \\ gn \end{Bmatrix}\#$	find, wild, sign	13,3
	24	i → [ay] /__gh	high, right	19,2
	25	i → [y] /C__VC	million, onion	23,2
	26	i → [ay] /__-V	liar, diet	25,2
	27*	i → [ɪ] /__ C ity	humidity, captivity	24,4
	28*	$i \rightarrow [ɪ]\ /\ \_\_C \begin{Bmatrix} ic \\ id \\ ish \\ it \end{Bmatrix}$	clinic, timid, finish, limit	24,3

Grapheme Unit	Rule #	Rule Description	Examples	Position in sequence
I	32	i → Ø	aspirin	27,6
	35*	i → [i]	police, ski	23,2
	36*	i → [i] /__ -V	radio, period	25,3
	38	i → [ɪ] /__$\begin{Bmatrix}vV\\x(l)V\end{Bmatrix}$	civic, river	24,2
O	11	o → [o] /__Ce#	home, smoke	6,2
	12	o → [o] /__C$\begin{Bmatrix}r\\l\end{Bmatrix}$e#	ogre, noble	25,4
	13	o → [o] /__CV	notice, odor	18,1
	14	o → [o] /__C$\begin{Bmatrix}r\\l\end{Bmatrix}$ V	okra, only	25,5
	15	o → [a] /__C(C)#	lot, lock	1,6
	16	o → [a] /__CC....	motto, hockey	8,2
	17	o → [ə], [ɪ] in unstressed syllables	cotton, sailor	10,1
	21	o → [o], [ɔ], [a] /__r	horn, tortoise	9,1
	22	o → [ə] /w__rC	word, worth	9,3
	23	o → [o] /__lC#	roll, gold, yolk, bolt	13,2
	24	o → [ɔ], [a] /__$\begin{Bmatrix}fC\\ng\\ss\\st\\th\\g\#\end{Bmatrix}$	off, soften, song, moss, lost, moth, dog	13,3
	25	o → [o] /__#	go, motto	18,4
	26	o → [o] /__-V	poem	25,2
	28*	o → [a] /__C$\begin{Bmatrix}ic\\id\\ish\\it\end{Bmatrix}$	phonics, solid, abolish, profit	24,3

Grapheme Unit	Rule #	Rule Description	Examples	Position in sequence
O	31	o → [ə]	won, mother, some, love	13,1
	32	o → ∅	sophomore, licorice	27,6
	38	$o \rightarrow [a] /\_\_\left\{\begin{matrix}vV\\ x(1)V\end{matrix}\right\}$	novel, oxen	24,2
U	11	u → [(y)u] /__Ce#	use, crude	6,2
	12	$u \rightarrow [(y)u] /\_\_C\left\{\begin{matrix}r\\ 1\end{matrix}\right\}e\#$	bugle	25,4
	13	u → [(y)u] /__CV	unit, crusade	18,1
	14	$u \rightarrow [(y)u] /\_\_C\left\{\begin{matrix}r\\ 1\end{matrix}\right\}V$	bugler	25,5
	15	u → [ə] /__C(C)#	gum, fuss	1,6
	16	u → [ə] /__CC....	sudden, justice	8,2
	17	u → [ə], [ɪ] in unstressed syllables	lettuce, minute	10,1
	20	u → ∅ /#g__V	guest, guard	19,6
	21*	u → [ə] /__r	fur, burn	9,1
	26	u → [(y)u] /__-V	fluid, ruin	25,6
	31	u → [ʊ]	bull, push, put	13,1
	32	u → ∅	natural	27,6
Y	11	y → [ay] /__Ce#	rhyme, type	23,3
	12	$y \rightarrow [ay] /\_\_C\left\{\begin{matrix}r\\ 1\end{matrix}\right\}e\#$	cycle	25,4
	13	y → [ay] /__CV	tyrant, papyrus	23,3
	14	$y \rightarrow [ay] /\_\_C\left\{\begin{matrix}r\\ 1\end{matrix}\right\}V$	cyclone, hydrant	25,5
	15	y → [ɪ] /__C(C)#	myth, gym	23,3

Grapheme Unit	Rule #	Rule Description	Examples	Position in sequence
Y	16	y → [ɪ] /__CC...	system, gypsy	23,3
	17	y → [i], [ɪ] /__# in unstressed syllables	baby, candy	10,2
	19	y → [ay] /__# in stressed syllables	deny, try	3,2
	26*	y → [ay] /__-V	hyena	25,2
	28*	y → [ɪ] /__C $\begin{Bmatrix} ic \\ id \\ ish \\ it \end{Bmatrix}$	physic	24,3
	36*	y → [i] /__-V	Tokyo	25,3

Spelling-to-sound correspondences for secondary vowels

Grapheme Unit	Rule #	Rule Description	Examples	Position in sequence
AI	10	ai → [e]	stain, rain	16,1
	17	ai → [ə], [ɪ] in unstressed syllables	captain, villain	26,3
AU	10	au → [ɔ]	cause, author	16,4
AW	10	aw → [ɔ]	saw, hawk	16,4
AY	10	ay → [e]	day, play	12,1
EA	11	ea → [i]	each, heat	12,2
	31	ea → [ε]	bread, deaf, heaven	12,2
	33	ea → [ə] /__r	earn, search	26,4
EE	10	ee → [i]	beet, feel	3,1
EI	10	ei → [i]	receive, ceiling	26,5
	20	ei → [e] /__ $\begin{Bmatrix} gn \\ n \\ gh \end{Bmatrix}$	reign, rein, neighbor	26,6

Grapheme Unit	Rule #	Rule Description	Examples	Position in sequence
EW	10	ew → [(y)u]	few, new	16,6
EY	10	ey → [e]	they, obey	26,6
	17	ey → [i] in unstressed syllables	donkey, money	26,2
IE	11	ie → [ay] /__#	die, lie	19,2
	12	ie → [i] /__....	field, grief	26,5
	17	ie → [i] /__# in unstressed syllables	collie, movie	26,2
OA	10	oa → [o]	load, boat	16,3
OE	10	oe → [o] /__#	hoe, toe	16,3
OI	10	oi → [oy]	noise, join	16,5
OO	11	oo → [u]	broom, tool	12,3
	12	oo → [ʊ]	book, wood	12,3
OU	10	ou → [aw]	count, moutain	16,2
	31	ou → [ə]	couple, young	26,7
	33	ou → [(y)u]	through, group	26,7
	34	ou → [ɔ]	fought, thought	26,7
	35	ou → [o]	soul, though	26,7
OW	11	ow → [o]	glow, below, own, bow	12,4
	12	ow → [aw]	now, allow, owl, bow	12,4
OY	10	oy → [oy]	boy, toy	16,5
UE	10	ue → [(y)u]	blue, argue	16,6
UI	10	ui → [(y)u]	fruit, juice	16,6
	31	ui → [ɪ]	build, biscuit	26,8

Spelling-to-sound correspondences for consonants

Grapheme Unit	Rule #	Rule Description	Examples	Position in sequence
B	10	$b \rightarrow [b]$	boy, cub, number	1,5
	20	$b \rightarrow \emptyset \; / m\_\_\#$	climb, comb	19,4
BB	10	$bb \rightarrow [b]$	bubble, blubber	1,5 (9,2)[11]
C	11	$c \rightarrow [s] \; / \_\_ \begin{Bmatrix} e \\ i \\ y \end{Bmatrix}$	city, lace, fancy	7,1
	12	$c \rightarrow [k] \; / \_\_ \begin{Bmatrix} a \\ o \\ u \\ C \\ \# \end{Bmatrix}$	cat, come, cut cream, picnic, scare	4,2
CC	11*	$cc \rightarrow [ks] \; / \_\_ \begin{Bmatrix} e \\ i \\ y \end{Bmatrix}$	accent, succeed	20,4
	12	$cc \rightarrow [k] \; / \_\_ \begin{Bmatrix} a \\ o \\ u \end{Bmatrix}$	yucca, account, accuse	11,5
CH	10	$ch \rightarrow [\check{c}]$	cheap, church	11,2
	31	$ch \rightarrow [k]$	ache, school, chord, Christ	20,2
CK	10	$ck \rightarrow [k]$	kick, pack	4,2
D	10	$d \rightarrow [d]$	dead, needle	1,4
DD	10	$dd \rightarrow [d]$	hidden, sudden	1,4
F	10	$f \rightarrow [f]$	fat, after	4,1
FF	10	$ff \rightarrow [f]$	off, taffy	4,1

---

[11] The unit in parentheses after some double consonant rules indicates the first actual occurrence.

Grapheme Unit	Rule #	Rule Description	Examples	Position in sequence
G	11	$g \rightarrow [\check{j}] \ / \ \_\_ \begin{Bmatrix} e \\ i \\ y \end{Bmatrix}$	gem, age, gin, gypsy	7,1
	12	$g \rightarrow [g] \ / \ \_\_ \begin{Bmatrix} a \\ o \\ u \\ C \\ \# \end{Bmatrix}$	gave, go, gum, green, bag	4,3
	20*	$g \rightarrow \emptyset \ / \ \begin{Bmatrix} \#\_\_n \\ \_\_n\# \end{Bmatrix}$	gnaw, sign	19,3
	31	$g \rightarrow [g]$	get, girl	11,6
GG	10	$gg \rightarrow [g]$	egg, wiggle	11,5
GH	10	$gh \rightarrow \emptyset$	though, taught, high	19,2
H	10	$h \rightarrow [h]$	home, ahead	1,6
	20	$h \rightarrow \emptyset$	rajah, hour	19,2
J	10	$j \rightarrow [\check{j}]$	joy, judge	4,4
K	10	$k \rightarrow [k]$	milk, kill	4,1
	20	$k \rightarrow \emptyset \ /\#\_\_n$	know, knot	19,3
L	10	$l \rightarrow [l]$	like, mile	1,3
	20	$l \rightarrow \emptyset \ / \ \begin{Bmatrix} o\_\_k \\ a\_\_f \\ a\_\_k \\ a\_\_m \\ a\_\_v \end{Bmatrix}$	yolk, folk, half, calf, walk, stalk, palm, calm, calves, salve	19,5
LE	22	$le \rightarrow [əl] \ /C\_\_\#$	little, stable	10,2
LL	10	$ll \rightarrow [l]$	bullet, fill	1,3
M	10	$m \rightarrow [m]$	man, came	1,5
MM	10	$mm \rightarrow [m]$	summer, mammal	1,5 (9,2)
N	10	$n \rightarrow [n]$	no, nine, fun	1,1

Grapheme Unit	Rule #	Rule Description	Examples	Position in sequence
N	20	$n \rightarrow [\text{ŋ}] / \_\_ \begin{Bmatrix} x \\ k \\ qu \\ g \text{ pronounced } [g] \\ c \text{ pronounced } [k] \end{Bmatrix}$	anxious, thank, sink, banquet, single, fungus, finger, Lincoln	4,1
NG	10	$ng \rightarrow [\text{ŋ}] / \_\_\#$	ring, song	5,5
NN	10	$nn \rightarrow [n]$	inner, funny	1,1
P	10	$p \rightarrow [p]$	people, pop	1,2
PP	10	$pp \rightarrow [p]$	pepper, apple	1,2 (9,2)
PH	10	$ph \rightarrow [f]$	phone, photo	20,2
QU	10	$qu \rightarrow [kw]$	quick, banquet	11,4
R	10	$r \rightarrow [r]$	run, far	1,6
RR	10	$rr \rightarrow [r]$	hurry, marriage	1,6 (9,1)
S	10	$s \rightarrow [s]$	sun, fast, horse	1,3
	20	$s \rightarrow [z] / V\_\_V$	nose, easy	18,2
	21	$s \rightarrow [s] / \begin{Bmatrix} ou \\ oo \\ ea \\ a \end{Bmatrix} \_\_e$	house, moose, lease, case	18,2
	31	$s \rightarrow [z] / \_\_\#$	trousers, wives, riches	---[12]
SH	10	$sh \rightarrow [\check{s}]$	shoe, rush	2,1
SS	10	$ss \rightarrow [s]$	mess, missle	1,3

---

[12] Not explicitly taught as a correspondence rule.

Grapheme Unit	Rule #	Rule Description	Examples	Position in sequence
T	10	t → [t]	title, let	2,1
	20	$t \rightarrow \emptyset \,/ \left\{\begin{matrix} s\_\_le\# \\ s\_\_en\# \\ f\_\_en \end{matrix}\right\}$	wrestle, fasten, often	19,5
TCH	10	tch → [č]	match, notch	11,2
TH	11	th → [θ]	thin, bath	2,2
	12	$th \rightarrow [ð] \,/ \_\_ \left\{\begin{matrix} e \\ er \\ ern \end{matrix}\right\} \#$	bathe, father, northern	20,3
	13	th → [ð] in pronouns, conjunctions, and function words.	they, although, the	2,1
TT	10	tt → [t]	little, mitt	1,1 (9,2)
V	10	v → [v]	vase, love	4,5
W	10	w → [w]	wet, beware	4,1
	20	w → ∅ /#__r	wren, wrong	19,3
WH	10	wh → [hw] or [w]	when, whether	11,3
X	10	x → [ks]	box, oxen	4,4
Y	10	y → [y]	yet, beyond	4,4
Z	10	z → [z]	zoo, lazy	4,5
ZZ	10	zz → [z]	buzz, fuzzy	4,5 (10,1)

APPENDIX D

ALPHABETICAL LIST OF RULES AND PRONUNCIATIONS

Grapheme Unit	Rule Number	Pronunciation	Position in sequence
A	11	[e]	6,1
	12	[e]	25,4
	13	[e]	18,1
	14	[e]	25,5
	15	[æ]	1,1
	16	[æ]	8,2
	17	[ə], [ɪ]	10,1
	21	[a]	9,1
	22	[ɛ], [æ]	18,3
	23	[ɔ]	13,2
	24	[a], [ɔ]	23,1
	25	[o]	9,3
	26	[e]	25,2
	27	[æ]	24,4
	28	[æ]	24,3
	29	[e]	23,1
	32	0	27,6
	38	[æ]	24,2
AI	10	[e]	16,1
	17	[ə], [ɪ]	26,3
AU	10	[ɔ]	16,4
AW	10	[ɔ]	16,4
AY	10	[e]	12,1
B	10	[b]	1,5
	20	0	19,4
BB	10	[b]	1,5
C	11	[s]	7,1
	12	[k]	4,2
CC	11	[ks]	20,4
	12	[k]	11,5
CH	10	[č]	11,2
	31	[k]	20,2

Grapheme Unit	Rule Number	Pronunciation	Position in sequence
CK	10	[k]	4,2
D	10	[d]	1,4
DD	10	[d]	1,4
E	11	[i]	6,2
	13	[i]	18,1
	14	[i]	25,5
	15	[ɛ]	1,4
	16	[ɛ]	8,2
	17	[ə], [ɪ]	10,1
	18	0	6,1
	21	[ə]	9,1
	25	[i]	3,1
	26	[i]	25,2
	27	[ɛ]	24,4
	28	[ɛ]	24,3
	32	0	27,6
	38	[ɛ]	25,2
EA	11	[i]	12,2
	31	[ɛ]	12,2
	33	[ə]	26,4
EE	10	[i]	3,1
EI	10	[i]	26,5
	20	[e]	26,6
EW	10	[(y)u]	16,6
EY	10	[e]	26,6
	17	[i]	26,2
F	10	[f]	4,1
FF	10	[f]	4,1
G	11	[ǰ]	7,1
	12	[g]	4,3
	20	0	19,3
	31	[g]	11,6

Grapheme Unit	Rule Number	Pronunciation	Position in sequence
GG	10	[g]	11,5
GH	10	Ø	19,2
H	10	[h]	1,6
	20	Ø	19,2
I	11	[ay]	6,1
	12	[ay]	25,4
	13	[ay]	18,1
	14	[ay]	25,5
	15	[ɪ]	1,1
	16	[ɪ]	8,2
	17	[ə], [ɪ]	10,1
	21	[ə]	9,1
	22	[ay]	13,3
	24	[ay]	19,2
	25	[y]	23,2
	26	[ay]	25,2
	27	[ɪ]	24,4
	28	[ɪ]	24,3
	32	Ø	27,6
	35	[i]	23,2
	36	[i]	25,3
	38	[ɪ]	24,2
IE	11	[ay]	19,2
	12	[i]	26,5
	17	[i]	26,2
J	10	[ǰ]	4,4
K	10	[k]	4,1
	20	Ø	19,3
L	10	[l]	1,3
	20	Ø	19,5
LE	22	[əl]	10,2
LL	10	[l]	1,3
M	10	[m]	1,5
MM	10	[m]	1,5
N	10	[n]	5,5
	20	[ŋ]	4,1

Grapheme Unit	Rule Number	Pronunciation	Position in sequence
NG	10	[ŋ]	5,5
NN	10	[n]	1,1
O	11	[o]	6,2
	12	[o]	25,4
	13	[o]	18,1
	14	[o]	25,5
	15	[a]	1,6
	16	[a]	8,2
	17	[ə], [ɪ]	10,1
	21	[o], [ɔ], [a]	9,1
	22	[ə]	9,3
	23	[o]	13,2
	24	[ɔ], [a]	13,3
	25	[o]	18,4
	26	[o]	25,2
	28	[a]	24,3
	31	[ə]	13,1
	32	Ø	27,6
	38	[a]	24,2
OA	10	[o]	16,3
OE	10	[o]	16,3
OI	10	[oy]	16,5
OO	11	[u]	12,3
	12	[ʊ]	12,3
OU	10	[aw]	16,2
	31	[ə]	26,7
	33	[(y)u]	26,7
	34	[ɔ]	26,7
	35	[o]	26,7
OW	11	[o]	12,4
	12	[aw]	12,4
OY	10	[oy]	16,5
P	10	[p]	1,2
PH	10	[f]	20,2
PP	10	[p]	1,2

Grapheme Unit	Rule Number	Pronunciation	Position in sequence
QU	10	[kw]	11,4
R	10	[r]	1,6
RR	10	[r]	1,6
S	10	[s]	1,3
	20	[z]	18,2
	21	[s]	18,2
SH	10	[š]	2,1
SS	10	[s]	1,3
T	10	[t]	1,1
	20	Ø	19,5
TCH	10	[č]	11,2
TH	11	[θ]	2,2
	12	[ð]	20,3
	13	[ð]	2,1
TT	10	[t]	1,1
U	11	[(y)u]	6,2
	12	[(y)u]	25,4
	13	[(y)u]	18,1
	14	[(y)u]	25,5
	15	[ə]	1,6
	16	[ə]	8,2
	17	[ə], [ɪ]	10,1
	20	Ø	19,6
	21	[ə]	9,1
	26	[(y)u]	25,6
	31	[ʊ]	13,1
	32	Ø	27,6
UE	10	[(y)u]	16,6
UI	10	[(y)u]	16,6
	31	[ɪ]	28,8
V	10	[v]	4,5
W	10	[w]	4,1
	20	Ø	19,3

Grapheme Unit	Rule Number	Pronunciation	Position in sequence
WH	10	[hw], [w]	11,3
X	10	[ks]	4,4
Y	10	[y]	4,4
	11	[ay]	23,3
	12	[ay]	25,4
	13	[ay]	23,3
	14	[ay]	25,5
	15	[ɪ]	23,3
	16	[ɪ]	23,3
	17	[i], [ɪ]	10,2
	19	[ay]	3,2
	26	[ay]	25,2
	28	[ɪ]	24,3
	36	[i]	25,3
Z	10	[z]	4,5
ZZ	10	[z]	4,5

APPENDIX E

SOUTHWEST REGIONAL LABORATORY
DEVELOPMENT MEMORANDUM

DM9
DATE: April 17, 1969
RELEASE: Howard J. Sullivan

CONTENT AND SEQUENCE FOR BLOCK I OF THE 1970 READING PROGRAM

Betty Berdiansky and George Stanton

Previous work has led to identification of an extensive lexicon upon which the SWRL 1970 primary-grade reading program will be based, as well as to the development of a considerable number of sound-symbol correspondence rules (see Berdiansky, Cronnell, and Koehler, 1969). The present document describes the initial steps taken in the development of a complete sequencing of these rules. This sequencing procedure is being based, in general, on the Desberg and Cronnell (1969) analysis of the characteristics of the rules. For the first block of this sequence, the rules were ordered primarily on the basis of their combined productivity, i.e., the number of words from the given lexicon which can be generated by the given combination of rules. The sequencing of rules and the listing of resultant useable words is covered in this report for the first block of rules only. Within- and across-block sequencing has not yet been entirely completed.

The Desberg and Cronnell paper categorizes grapheme-phomene rules of correspondence into 17 sequenced blocks according to classification and sequencing rationales described by the authors of the paper. These rationales will not be discussed in this report at any greater length than is necessary to indicate the reasoning behind specific modifications of the Desberg and Cronnell sequence. Following are the steps gone through by the staff in their decisions on rule sequencing.

Step 1. The Desberg and Cronnell paper combined consonant rules, primary vowel rules, and secondary vowel rules into homogeneous groupings (Blocks). The Block I consonant rules: S10, N10, M10, R10, L10, T10, D10, P10, B10, and the Block I primary vowel rules: I15, A15, E15, U15, O15, (the "short vowels") were selected and assigned to initial blocks because of their high frequency and regularity. The initial block of the secondary vowel rules consisted only of Rule EE10. It was designated to Block I because it was the most regular secondary vowel rule, although the second most frequent. In the earliest stages of this program, rule regularity was seen as more crucial than rule frequency.

Step 2. The Rule 15 printout for each vowel and the Rule EE10 printout were consulted, and those words which were composed of only those vowels and consonants comprising Block I were listed. Also, the "40-words" sub-group ("40 words" are words containing at least one irregular grapheme - phoneme correspondence) for each of these regular vowel rules was examined, and a separate list was made of words containing a Block I grapheme's 40 rule in addition to the regular Block I rules. Then the I40, A40, E40, U40, O40, and EE40 printouts were consulted, and words containing the assigned consonants and vowels operating under Block I regular or 40 rules were listed. Only the vowel-rule printouts had to be consulted, since they included all the words which would have been in any of the consonant-rule printouts. Given below is an example of the format used for listing the words selected from the printouts:

A15				A40	
non-40s		40s		1 syl.	2 syl.
1 syl.	2 syl.	1 syl.	2 syl.		

Step 3. For each vowel-rule, a cumulative chart was constructed, (i.e., each word entry occurs as soon as all component letters of the word are listed, but not before). This chart used the Desberg and Cronnell consonant Block I sequence: S, N, M, R, L, T, D, P, B; which was based on the idea that, since continuants blend easier than stops, it would be best to use them at the outset of instruction. The chart showed the order of occurrence of these words which could be taught from the Block I vowel and Block I consonant rules. It also showed the rules prerequisite to teaching a given word, provided the rules were taught in this order. For example, for the primary vowel Rule 015, the cumulative list of possible words from the consonant-10 rules S, N, M, R, L, and T was as follows:

	non 40s		40s		040s	
	1 syl.	2 syl.	1 syl.	2 syl.	1 syl.	2 syl.
S						
N						
M	mom					
R						
L					sol	
T	lot, not rot, slot tot, trot	tom-tom				

Step 4. When charts for all vowel-15 rules, with the consonants ordered S, N and so forth, were inspected, the resulting words-per-rule ratio was quite low in the early steps of the sequence. As a first step in leading to the construction of a more productive sequence, the number of words in which each of the nine consonants occurred with each of the six vowels was determined. This information would be useful in developing the most productive order of rule introduction, since no cumulative restrictions would be placed on the count of consonant vowel pairs. Therefore, the following list was constructed:

	Total	I15	A15	E15	U15	O15	EE10**
*H10	25	6	4	6	7	2	
S10	112	21	27	24	25	6	9
N10	76	14	22	22	13	5	
M10	64	14	14	10	21	5	
R10	63	12	11	6	20	6	8
L10	86	26	15	22	9	8	6
T10	129	25	33	28	24	15	8
D10	76	12	20	19	6	11	8
P10	113	27	27	15	20	16	8
B10	60	7	16	10	16	7	4
	359	71	80	64	67	40	27

Since the words covered by Block I rules have just one vowel apiece, each word contributed a tally in the appropriate vowel column for each different consonant it contained. For example, the word "smart" would contribute a tally in each of the following four cells of the A15 column: A-S, A-M, A-R, and A-T. Summing across a row gives the number of words in which that consonant occurs, since the words in this group had no more than one vowel. If a word repeated any consonants, only one tally, not two, was given to that particular consonant vowel combination. According to the "total" column of this matrix, the rank order of consonant rules, according to the frequency of their occurrence with all of the vowels in Block I, is: T10, P10, S10, L10, N10, D10, M10 R10, B10, H10. Similarly, the number of words in which each vowel rule occurred was counted. These figures are circled at the bottom of each column. (The circled numbers are not the sums of the columns. The sums would equal the number of times each vowel occurred with every other letter in each word of the lexicon.) The resulting rank order for the vowels was A15, I15, U15, E15, O15 and EE10. When individual cells in the matrix were rank ordered the result was: TA; TE; SA and PA; PI; LI and SU; SE; TI; SI, NA, NE and TU; LE, MU, RU and PU; DA and DE; BA; LA, BU and PO; TO; NI, MI, MA and PE; RI and NU; DI, RA and DO; BE.

---

*The rule H10 was added to Block I, although it was not in the original Desberg and Cronnell sequence, because SH and TH rules are scheduled for Block II. It was felt the Block I should contain, S, T and H rules separately before their introductions as digraphs.

**It was later decided to move the EE10 rule into Block II, although it was included in Block I when this matrix was constructed.

Step 5. The most frequent consonants and vowels were then chosen from the consonant-vowel matrix. The rank order of the appearance of these consonants and vowels was also considered, since these two manners of ranking the consonants and vowel in terms of productivity might give different results, hence requiring certain adjustments.

The primary vowel rules A15, I15 and E15 were both the most productive and the highest in rank order of appearance. Therefore, a chart was made which showed for each vowel the number of Block I words which could be formed by that vowel combined with one, two, or three specified Block I consonants.* (Five-letter combinations--i.e., 4 consonants-1 vowel--were not considered since they were relatively infrequent.) Charts 1, 2 and 3 give the results of this procedure (See Appendix A). The number following some of the consonant combinations in Charts 1, 2 and 3 indicates the number of words possible using that combination with that chart's vowel.

Step 6. Three more charts were made, based on the data from the first three. These new charts first listed the two-consonant, one-vowel combinations which, according to the first chart for that vowel, were combinable into the largest number of words. These initial combinations were then combined with each of the other most productive consonant rules for that same vowel. Thus, three-consonant, one-vowel combinations were established for all of the most productive consonants for a given vowel. (See Charts 4, 5 and 6 in Appendix A).

Step 7. The words for the most productive two-consonant, one-vowel combinations were listed and compared. They were:

N10, T10, A15 - ant, tan, at, an
L10, T10, I15 - ill, it, lit, till
N10, P10, I15 - nip, in, inn, pin

It had been decided, on the basis of efficency in maximizing productivity at this early stage, to include two vowels in the first unit. Thus, each of the above lists were expanded to include both A15 and I15, and the following lists were compared:

---

*At this point, it should be noted, that, for various reasons -- the most common being low anticipated utility--the following words were deleted from those under consideration: sop hell hemp pent rend smelt apt ass ban blab brad brat rat-tat tam tat lust mum pun rum rump sup trump dill din lisp pip primp spit. These deletions did not, however, affect the positions of A10, I10 and E10 as the most productive primary vowel rules.

N10, T10, A15, I15 - tin, tint, ant, tan, at, an, in, inn, it
L10, T10, A15, I15 - ill, at, it, till, lit
N10, P10, A15, I15 - an, in, inn, nap, pan, pin, nip

The combinations of N10, T10, A15 and I15, within this lexicon, proved to be the most productive and were therefore designated as Unit 1.

Step 8. For Unit 2, the most productive remaining consonant rules: S10, P10, L10 and D10 were each considered in combination with Unit 1. The following word lists resulted:

S10 - sat, sin, sit, its
P10 - pan, nap, pat, tap, pant, pit, tip, pin, nip
L10 - lit, ill, till, lint
D10 - and, did

Thus, P10 was designated as Unit 2.

Step 9. For Unit 3, vowel Rule E15 and the remaining most productive consonant rules (L10, S10 and D10) were considered. The most productive pair was sought. This was, by far, L10 and S10. This pair, when combined with N10, T10, P10, A15 and I15, yielded 40 new words. D10 and E15 then became Unit 4.

Step 10. The remaining rules (M10, B10, H10, R10, O15 and U15) needed to be combined in a reasonable way for Units 5 and 6. The rules M10, B10, and U15 were designated Unit 5, the others as Unit 6. This resulted in a rather even split of the block's remaining words, with Unit 6 containing a few more than Unit 5. The final organization of rules and word exemplars for Block 1 is presented in Appendix B.

APPENDIX A

FREQUENCY COUNTS FOR BLOCK I RULES IN COMBINATION

Chart 1: Consonant - combination frequencies for 115 words in Block I

T: 1	S	P	L: 1	N: 2	B: 1	D: 1	M	H	R
TS: 1	ST: 1	PT: 2	LT: 2	NT	BT: 1	DT	MT: 1	HT: 1	RT
TP	SP: 1	PS	LS: 1	NS	BS	DS	MS: 1	HS	RS
TL	SL	PL	LP: 2	NP: 2	BP	DP: 1	MP: 1	HP: 1	RP: 1
TN: 2	SN: 1	PN	LN	NL	BL: 1	DL	ML	HL: 1	RL
TB	SB	PB	LB	NB	BN: 1	DN	MN	HN	RN
TD	SD	PD	LD: 1	ND	BD: 1	DB	MB	HB	RB: 1
TM	SM	PM	LM: 1	NM	BM	DM: 1	MD	HD: 1	RD: 1
TH	SH	PH	LH	NH	BH	DH	MH	HM: 1	RM: 1
TR	SR	PR	LR	NR	BR	DR	MR	HR	RH
TRL: 1	SLD: 1	PRM: 1	LMP: 1		BLS: 1	DRL: 1	MST: 1	HNT: 1	
TRM: 1	SLM: 1		LNT: 1			DRP: 1			
	SLP: 2		LST: 3						
TRP: 1	SNP: 2								

Chart 2: Consonant - combination frequencies
for A15 words in Block I

T: 1	S	P	L	N: 1	B	D: 2	M: 1	H	R
TS	ST: 1	PT: 2	LT	NT	BT: 2	DT	MT: 1	HT: 1	RT: 1
TP	SP	PS: 2	LS: 1	NS	BS: 1	DS	MS: 1	HS	RS
TL	SL	PL	LP: 2	NP: 2	BP	DP	MP: 1	HP	RP: 1
TN: 2	SN	PN	LN	NL	BL	DL	ML	HL	RL
TB	SB	PB	LB	NB:	BN	DN	MN: 1	HN	RN: 1
TD	SD: 1	PD: 1	LD: 1	ND: 1	BD: 1	DB: 1	MB	HB	RB
TM	SM	PM	LM	NM	BM	DM: 2	MD	HD: 1	RD
TH	SH	PH	LH	NH	BH	DH	MH	HM: 1	RM: 1
TR	SR	PR	LR	NR	BR	DR	MR	HR	RH
—	—	—	—	—	—	—	—	—	—
TRP: 1	SND: 1	PNT: 1	LMP: 1		BND: 1	DMP: 1	MST: 1	HND: 1	
	SLB: 1	PST: 3	LND: 1		BRN: 1				
	SLM: 1	PLN: 1	LST: 1		BRS: 1				
	SLP: 1								
	SNP: 2								
	STB: 1								

Chart 3: Consonant - combination frequencies
for E15 words in Block I

T	S	P: 1	L	N	B	B	M	H	R
TS	ST: 2	PT: 1	LT: 2	NT: 3	BT: 1	DT	MT: 1	HT	RT
TP	SP	PS	LS: 1	NS	BS	DS	MS: 1	HS	RS
TL	SL	PL	LP	NP	BP	DP	MP	HP	BP
TN	SN	NP: 1	LN	NL	BL: 1	DL: 2	ML	HL	RL
TB	SB	PB	LB	NB	BN	DN: 1	MN: 1	HN: 1	RN
TD	SD	PD	LD	ND: 1	BD: 1	DB	MB	HB	RB
TM	SM	PM	LM: 1	NM	BM	DM	MD	HD	RD: 1
TH	SH	PH	LH	NH	BH	DH	MH	HM: 1	RM
TR	SR	PR	LR	NR	BR	Dr	MR	HR	RH
—	—	—	—	—	—	—	—	—	—
	SND: 1	PLT: 1	LND: 1		BLT: 1	DNT: 2	MLT: 1	HLD: 1	RNT: 1
	SNT: 2	PST: 1			BND: 1	DRS: 1	MND: 1	HLP: 1	RST: 1
	SLD: 1	PRS: 1			BNT: 1				
	SML: 1				BST: 1				
	SPD: 1				BLD: 1				
	SPL: 1				BLS: 1				
	STM: 1								

Chart 4: Most frequent two- and three-letter combinations for 115 words in Block 1

CONSONANT COMBINATION	NUMBER OF WORDS OBTAINABLE	CONSONANT-RULE ADDED	TOTAL NUMBER OF WORDS OBTAINABLE
PT	3	S	6
		L	8
LT	4	P	8
		S	10
TN	5	P	9
		S	8
		L	9
LP	3	S	7
		T	8
NP	4	T	9
		S	8
		L	7

Chart 5: Most frequent two- and three-letter combinations for A15 words in Block I

CONSONANT COMBINATION	NUMBER OF WORDS OBTAINABLE	CONSONANT-RULE ADDED	TOTAL NUMBER OF WORDS OBTAINABLE
PS	2	N	7
		T	9
		L	6
		M	5
		D	6
PT	3	N	9
		S	9
		L	5
		M	6
		D	6
PL	2	N	6
		S	6
		T	5
		M	5
		D	6
PN	3	S	7
		T	9
		M	6
		L	6
		D	7

Chart 5: For A15 - Continued

INITIAL COMBINATION	NUMBER OF WORDS OBTAINABLE	CONSONANT RULE ADDED	TOTAL NUMBER OF WORDS OBTAINABLE
NT	4	S	5
		L	4
		M	7
		D	7
		P	9
DM	5	N	8
		T	7
		L	6
		P	8
		S	7

Chart 6: Most frequent two- and three-letter combination for 115 words in Block I

INITIAL COMBINATION	NUMBER OF WORDS OBTAINABLE	CONSONANT-RULE ADDED	TOTAL NUMBER OF WORDS OBTAINABLE
TS	2	L	5
		N	6
		D	2
LT	2	S	5
		N	5
		D	4
NT	3	S	7
		L	5
		D	7
DL	2	S	4
		T	4
		N	5

APPENDIX F

SWRL SOUTHWEST REGIONAL LABORATORY TECHNICAL NOTE

DATE: August 27, 1970
NO: TN 5-70-20

TITLE: WORDLIST

AUTHOR: Richard Angilly and Lanaii Kline

ABSTRACT

WORDLIST sequences a lexicon of words (coded for spelling-to-sound correspondences) in such a way that, with the introduction of each correspondence rule, the words listed by the program contain that rule in combination with previously introduced rules.

This document is intended for internal staff distribution and use. Permission to reprint or quote from this working document, wholly or in part, should be obtained from SWRL, 11300 La Cienega Boulevard, Inglewood, California, 90304.

WORDLIST

1.0 - PROGRAM IDENTIFICATION

WORDLIST

2.0 - OBJECTIVE

The purpose of the computer program for the 1970 Reading Program was to sequence the lexicon of 6000 words (coded for spelling-to-sound correspondences) in such a way that, with the introduction of each correspondence rule, the words listed by the program would contain that rule in combination with previously introduced rules. In addition, the program provided the following supplemental information:

1. a count of the number of words listed upon the introduction of each rule;
2. a count of the number of words listed for each unit of rules;
3. a count of the number of words listed for each block of units of rules;
4. an alphabetical listing of the non-coded (polysyllabic) words.

This program was run separately for the portion of the lexicon designated as appropriate for the 6-7 age group and again for the lexicon for the 8-9 age group.

An adjunct to the program classified the irregular words in the same manner as the regular words except that the irregular rule(s) within the words were designated as equivalent, for sequencing purposes, to their earliest-appearing regular counterparts (e.g., A40 = A15).

3.0 - PROGRAM DESCRIPTION

3.1 - Program Logic

The program is set up in two parts. The first goes through a list of words from file, ICARD, and checks for the rules associated with that word. If there are no rules, the program stores the word in file, NRLST; otherwise, the program finds the highest rule associated with that word by comparing the rules to the hierarchy of the rules in file, IRULST. The program then determines if the high rule is a forty-rule. If so, the word is stored in file, TABLE, with a flag equal to one; otherwise, the flag is equal to zero. TABLE and NRLST are alphabetically sorted since IRULST is alphabetized. The second phase of execution determines the words with forty-rules and bypasses them. The remaining words (regular rules) are sorted by rule, and each rule is then sequenced according to the number of words which use that rule. Based on that number, space is created on a random access file. The file is then printed on a PRINT file. The forty-rules are also sequenced according to the number of words using that rule. Space is allocated on a random access file; then the file is printed on PRINT followed by the words in file, NRLST.

3.2 - Variables

- IREG(268) - frequency counter for that rule-name for rule based words.
- IFOR(268) - frequency counter for that rule-name for forty-words.
- IBLK(268) - block number (from 01 to 22).
- IUNT(268) - unit number (associated with the block number).
- ISYLA(268) - syllable duplication indicator
  - (' ' - only occurrence of rule-name)
  - (0 - first occurrence of rule-name; associated with one syllable words)
  - (1 - second occurrence of rule-name; associated with word having emphasis on its first syllable)
  - (2 - third (last) occurrence of rule-name; associated with word having emphasis on its second syllable)
- IRULSTZ(268) - individual rule-name (arranged hierarchially: 1 to 220) (two special rule-names: 'E7980' - if 'E' indicator present in col. 79 or 80 of input) 'FORTY' - for words having only '40' rule-names)
- IWORD - the word up to and including 16 characters.
- IRULES - rule-names associated with the word (3, 4, or 5 characters in length; separated by a comma)
- ISYLL - syllable notation
  - ' ' - no rule words
  - 0 - one-syllable words
  - 1, 3, 4 - more than one syllable having stress on first syllable.
  - 2 - more than one syllable having stress on second syllable.
- 179E and 180E - special indicators (' ' and E) (E implies highest rule-name associated with that word would be rule-name 'E7980' concerning words having special 'E' endings)
- HIRULE - highest rule-name associated with that word
- HI - hierarchial number associated with that rule name (1 to 220)

LONG - indicator: IZERO = 0 = rule-based words
IZERO LONG = 1 = forty-words

4.0 - SUBROUTINES AND FUNCTIONS

REPOSITION - repositions records on disk. An ITS library routine.

5.0 - DATA SPECIFICATIONS

5.1 - Input Formats

File:	IRULST	variable	format
	Col 1	INK(268)	A1
	Col 2-6	IRULSTZ(5,268)	5A1
	Col 7	ISYLA(268)	A1
	Col 8-9	IBLK(268)	12
	Col 10	IUNT(268)	I1
	Col 11-13	IREG(268)	13
	Col 14-16	IFOR(268)	13
File:	ICARD		
	Col 3-18	IWORD(4)	4A4
	Col 19-68	IRULES(50)	50A1
	Col 69	ISYLL	I1
	Col 79-80	179E and 180E	2A1

5.2 - Output Formats

File:	TABLE	variable	format
	Col 1	LONE or IZERO	I1
	Col 2-17	IWORD(4)	4A4
	Col 18-22	HIRULE(5)	5A1
	Col 23-25	HI	13
File:	NRLST		
	Col 1-16	IWORD(4)	4A4
File:	RULST		
	Col 1-5	IRULSTZ(5,268)	5A1
	Col 6	ISYLA(268)	A1
	Col 7-8	IBLK(268)	12
	Col 9	IUNT(268)	I1
	Col 10-12	IREG(268)	13
	Col 13-15	IFOR(268)	13
File:	WRDLST		
	Col 1-4	L or NUM	14
	Col 5-20	WORD(4)	4A4
	Col 21-25	HIRULE(5)	5A1
	Col 26-28	HI	13

6.0 - PROGRAM CONSTRAINTS AND LIMITATIONS

6.1 - Language

FORTRAN II

6.2 - Vendor

International Time Sharing Corporation

6.3 - Storage Requirements

Random Access Disk

6.4 - Hardware Configuration

CDC 3300

6.5 - Program Parameters

The current maximum array size is 268. This number corresponds to the total number of rules. To expand the rules the user must be sure to change the dimensions of those affected variables and to change those do-loops which fall under the influence of the number of rules used.

6.6 - Error Messages

The program prints out a list of errors in the rules, but will continue execution.

The program also types messages relating to the point in execution at which the program is currently located.

6.7 - Additional Information

An update program, CORRECT, works in conjunction with WORDLIST. See the documentation for CORRECT for further details.

7.0 - OPERATING INSTRUCTIONS

The program execution mode is via interactive operation through operator interaction at a console. The following is printed on the console as feed-back relating to the execution of the program:

```
"START OF EXECUTION"
"SECOND PASS BEGUN"
"WRDLST OPEN"
"WRDLST1 OPEN"
"NRLST OPEN"
"PROGRAM COMPLETED"
```

See Attachment 1 for sample data and Attachment 2 for sample run.

All output files (NRLST and TABLE) must be deleted manually. In order to get a printed output from the file, PRINT, the user must inform the operator to print the file and give him mailing instructions.

8.0 - FLOWCHART

Available upon request.

```
        PRØGRAM WØRDLIST
C      CREATES A WØRDLIST (CØRRESPØNDING TØ THE HIGHEST RULE-NAME)
C       FØR RULE-BASED-WØRDS AND FØRTY-WØRDS.
      INTEGER HIRULE,HI
      DIMENSIØN INK(268),IRULSTZ(5,268),ISYLA(268),IBLK(268),IUNT(268),
     1IREG(268),IFØR(268),IPØINT(268),IWØRD(4),IRULES(50),IRULE(5),
     2HIRULE(5)
      LØNE=1
      IZERØ=0
      NRTØT=0000
      TYPE,"START ØF EXECUTIØN"
      ØPEN(2).INPUT,IRULST
      DØ 10 I=1,268
      READ(2,1),INK(I),(IRULSTZ(N,I),N=1,5),ISYLA(I),IBLK(I),IUNT(I),
     1IREG(I),IFØR(I)
    1 FØRMAT(A1,5A1,A1,I2,I1,2I3)
   10 CØNTINUE
      TYPE,"IRULST INPUT"
      CLØSE(2)
      ØPEN(2),INPUT,ICARD
      ØPEN(3),ØUTPUT,TABLE
      ØPEN(4),ØUTPUT,NRLST
      WRITE(1,6)
    6 FØRMAT(25X,"ERRØR LIST",/)
    2 READ(2,4),(IWØRD(N),N=1,4),(IRULES(M),M=1,50),ISYLL,I79E,I80E
    4 FØRMAT(2X,4A4,50A1,I1,9X,2A1)
      IF END RECØRD 2,500
      J=1
      K=1
      IEND=0
      IFØRTY=0
      DØ 5 M=1,5
      IRULE(M)=" "
      HIRULE(M)=" "
    5 CØNTINUE
      HI=000
    8 IF(IRULES(J)-" ")15,20,15
   20 IF(IRULES(J+1)-" ")18,21,18
   21 IF(HI)80,22,80
   22 IF(J-4)24,80,80
   24 WRITE(4,16),(IWØRD(N),N=1,4)
   16 FØRMAT(4A4)
      NRTØT=NRTØT+1
      GØ TØ 2
   15 IF(IRULES(J)-",")18,23,18
   23 J=J+1
   19 DØ 29 K=1,5
      IF(IRULE(K)-"4")29,33,29
   33 IF(IRULE(K+1)-"0")70,30,70
   30 IFØRTY=1
      K=1
      GØ TØ 70
```

```
29   CONTINUE
     GO TO 70
18   IRULE(K)=IRULES(J)
     K=K+1
     J=J+1
     GO TO 8
70   DO 71 I=1,268
     DO 50 M=1,5
     IF(IRULE(M)-IRULSTZ(M,I))71,50,71
50   CONTINUE
73   IF(ISYLA(I)-" ")74,75,74
75   IF(HI)76,77,76
76   IF(HI-I)77,77,78
77   DO 56 M=1,5
     HIRULE(M)=IRULE(M)
56   CONTINUE
     HI=I
78   K=1
     DO 57 M=1,5
     IRULE(M)=" "
57   CONTINUE
     IF(IEND-1)8,79,8
79   IEND=0
     GO TO 80
74   IF(ISYLL)105,100,105
105  GO TO (101,102,101,101),ISYLL
100  IF(ISYLA(I)-"0")71,75,71
101  IF(ISYLA(I)-"1")63,75,63
63   IF(ISYLA(I)-"3")64,75,64
64   IF(ISYLA(I)-"4")71,75,71
102  IF(ISYLA(I)-"2")71,75,71
71   CONTINUE
     GO TO 110
80   DO 58 M=1,5
     IF(IRULE(M)-" ")81,58,81
58   CONTINUE
82   IF(I79E-"E")83,84,83
84   DO 59 M=1,5
     HIRULE(M)=IRULSTZ(M,236)
59   CONTINUE
     HI=236
     GO TO 90
83   IF(I80E-"E")90,84,90
81   IEND=1
     GO TO 19
90   IF(IFORTY-1)91,93,110
93   WRITE(3,94),LONE,(IWORD(N),N=1,4),(HIRULE(M),M=1,5),HI
94   FORMAT(I1,4A4,5A1,I3)
     I=HI
     IFOR(I)=IFOR(I)+1
     IFORTY=0
     GO TO 2
```

```
 91   WRITE(3,95),IZERØ,(IWØRD(N),N=1,4),(HIRULE(M),M=1,5),HI
 95   FØRMAT(I1,4A4,5A1,I3)
      I=HI
      IREG(I)=IREG(I)+1
      GØ TØ 2
110   WRITE(1,115),(IWØRD(N),N=1,4),(IRULES(M),M=1,50),ISYLL,
     1I79E,I80E
115   FØRMAT(/,4A4,50A1,I1,2A1)
      WRITE(1,117),(IRULE(M),M=1,5)
117   FØRMAT(8X,"*****ERRØR IN RULE ",5A1,/)
      GØ TØ 2
500   CLØSE(2)
      ØPEN(2),ØUTPUT,RULST
      DØ 300 I=1,268
      WRITE(2,310),(IRULSTZ(N,I),N=1,5),ISYLA(I),IBLK(I),IUNT(I),
     1IREG(I),IFØR(I)
310   FØRMAT(5A1,A1,I2,I1,2I3)
300   CØNTINUE
      CLØSE(2)
      ØPEN(2),ØUTPUT,PRINT
      TYPE,"SECØND PASS BEGUN"
      ISET=0
      CLØSE(4)
      ØPEN(4),ØUTPUT,WRDLST
505   CLØSE(3)
      ØPEN(3),INPUT,TABLE
      IUNIT=0000
      IBLØCK=0000
      ITØTAL=0000
      ICNT=0000
      IPØINT(1)=0001
      DØ 510 I=2,269
      IPØINT(I)=IPØINT(I-1)+IREG(I-1)
510   CØNTINUE
      LAST=IPØINT(269)-1
      DØ 515 L=1,LAST
      WRITE(4,516),L
516   FØRMAT(I4)
      INSERT(4)
515   CØNTINUE
520   READ(3,501),KEY,(IWØRD(N),N=1,4),(HIRULE(M),M=1,5),HI
501   FØRMAT(I1,4A4,5A1,I3)
      IF END RECØRD 3,525
      IF(ISET-0)508,507,508
507   IF(KEY-0)520,503,520
508   IF(KEY-1)520,503,520
503   J=HI
      SKIP(4),BEGINFILE
      SKIP(4),FØRWARD,IPØINT(J)-1,RECØRDS
      CALL REPØSITIØN(4)
      IPØINT(J)=IPØINT(J)+1
      WRITE(4,506),(IWØRD(N),N=1,4),(HIRULE(M),M=1,5),HI
```

```
506   FORMAT(4A4,5A1,I3)
      GO TO 520
525   WRITE(2,502)
502   FORMAT(/////,33X,"*********************")
      IF(ISET-0)522,521,522
521   WRITE(2,526)
526   FORMAT(33X,"* RULE-BASED-WORDS *")
      TYPE,"WRDLST OPEN"
      GO TO 528
522   WRITE(2,523)
523   FORMAT(33X,"*    FORTY-WORDS   *")
528   WRITE(2,504)
504   FORMAT(33X,"*********************",/////)
      WRITE(2,561)
561   FORMAT("***************BLOCK 1 ***************",//)
      CLOSE(4)
      IF(ISET)511,512,511
512   OPEN(4),INPUT,WRDLST
      GO TO 529
511   OPEN(4),INPUT,WRDLST1
529   I=1
      LINE=0
      IFIN=0
514   READ(4,530),NUM
530   FORMAT(I4)
      READ(4,532),(IWORD(N),N=1,4),(HIRULE(M),M=1,5),HI
532   FORMAT(4A4,5A1,I3)
      SKIP(4),FORWARD,1,RECORDS
      IF END FILE 4,536
      IF(LINE)517,513,517
513   IF(ISET)509,518,509
518   IF(INK(I)-"1")509,517,509
509   WRITE(2,527),(IRULSTZ(N,I),N=1,5),IREG(I)
527   FORMAT(5A1,5X,"FREQUENCY=",I3,/)
      IUNIT=IUNIT+IREG(I)
      IBLOCK=IBLOCK+IREG(I)
      ITOTAL=ITOTAL+IREG(I)
517   DO 535 M=1,5
      IF(HI-I)531,535,531
535   CONTINUE
      WRITE(2,540),(IWORD(N),N=1,4)
540   FORMAT(7X,4A4,/)
      LINE=1
      GO TO 514
536   IFIN=1
531   IF(IUNT(I)-IUNT(I+1))537,550,537
537   WRITE(2,541),IBLK(I),IUNT(I),IUNIT
541   FORMAT(10X,"BLOCK ",I2,"   UNIT ",I1,5X,"FREQUENCY=",I4,//)
      IF(IBLK(I)-IBLK(I+1))538,539,538
539   IUNIT=0000
      GO TO 550
```

```
538   WRITE(2,542),IBLK(I),IBLOCK
542   FORMAT(10X,"TOTAL BLOCK ",I2,5X,"FREQUENCY=",I4,//)
315   IUNIT=0000
      IBLOCK=0000
      IF(IFIN)552,565,552
565   WRITE(2,566),IBLK(I+1)
566   FORMAT("***************BLOCK ",I2," ***************",//)
550   I=I+1
      LINE=0
      GO TO 513
552   IF(IBLK(I)-23)565,575,575
575   WRITE(2,543),ITOTAL
543   FORMAT(///,25X,"###########TOTAL WORDS=",I4," ###########",/////)
      IF(ISET-1)551,555,555
551   ISET=1
      DO 560 I=1,268
      IREG(I)=IFOR(I)
560   CONTINUE
      TYPE,"WRDLST1 OPEN"
      CLOSE(4)
      OPEN(4),OUTPUT,WRDLST1
      GO TO 505
555   CLOSE(4)
      OPEN(4),INPUT,NRLST
      TYPE,"NRLST OPEN"
      WRITE(2,572)
572   FORMAT(/////,33X,"*************************")
      WRITE(2,558)
558   FORMAT(33X,"* WORDS WITH NO RULES *")
      WRITE(2,573)
573   FORMAT(33X,"*************************",/////)
557   READ(4,568),(IWORD(M),M=1,4)
568   FORMAT(4A4)
      IF END RECORD 4,581
      WRITE(2,569),(IWORD(M),M=1,4)
569   FORMAT(10X,4A4,/)
      DO 574 M=1,16
      IWORD(M)=" "
574   CONTINUE
      GO TO 557
581   WRITE(2,571),NRTOT
571   FORMAT(25X,"###########TOTAL WORDS=",I4," ###########",/////)
      TYPE,"PROGRAM COMPLETED"
      END
```

Attachment 1

IRULST
Database
(Sample Data)

N10	011
NN10	011
T10	011
TT10	011
A15	0011
I15	0011
P10	012
PP10	012
L10	013
LL10	013
S10	013
SS10	013
D10	014
DD10	014
E15	0014
M10	015
MM10	015
B10	015
BB10	015
U15	0015
R10	016
RR10	016
H10	016
015	0016
SH10	021
TH13	021
TH11	022
EE10	0031
E25	031
Y19	0032
F10	041
FF10	041
W10	041
K10	042
N20	042
C12	042
CK10	042
G12	043
J10	044
X10	044
Y10	044
V10	045
Z10	045
ZZ10	045
NG10	0050
E11	0062
C11	070
G11	070
A15	1081
E15	1081
[illegible]5	1081
[illegible]15	1081
U15	1081
A11	1081
E11	1081
I11	1081
011	1081
U11	1081
EE10	1081
Y19	1081
A16	1082
I16	1082
U16	1082
E16	1082
016	1082
A21	0091
021	0091
I21	0091
E21	0091
E21	1092
I21	1092
A21	1092
021	1092
A25	0093
022	0093
A25	1093
022	1093
I17	1101
U17	1101
E17	1101
A17	1101
017	1101
Y17	102
LE22	102
A11	2104
E11	2104
I11	2104
011	2104
U11	2104
A15	2104
U16	2104
A16	2104
016	2104
E16	2104
E21	2104
I21	2104
021	2104
A21	2104
A25	2104
022	2104
EE10	2104
Y19	2104
A17	2105
E17	2105
017	2105
U17	2105
I17	2105
A16	0140
E16	0140
I16	0140
016	0140
U16	0140
NG10	1111
NG10	2111
CH10	112
TCH10	112
WH10	113
QU10	114
GG10	115
CC12	115
G31	116
AY10	121
EA11	122
EA31	122
0011	123
0012	123
0W11	124
0W12	124
031	131
U31	131
A23	132
023	132
I22	133
024	133
E13	151
S31	153
E19	153
S20	154
S21	154
A22	155
UE10	161
IE11	161
0E10	161
AI10	162
0U10	163
0A10	164
AW10	165
AU10	165
0I10	166
0Y10	166
EW10	167
UI10	167
GH10	171
I24	171
K20	172
W20	172
B20	173
H20	173
L20	174
T20	174
U20	175
PH10	181
CH31	181
TH12	182
E7980	200
A12	211
I12	211
012	211
U12	211
E14	212
I14	212
A14	212
014	212
U14	212
Y11	213
Y15	213
A29	221
A24	221
I25	222
I26	231

Attachment 2

Wordlist
(Sample Output)

```
                                  ********************
                                  * RULE-BASED-WORDS *
                                  ********************


***************BLOCK 1***************

N10         FREQUENCY=  0

NN10        FREQUENCY=  0

T10         FREQUENCY=  0

TT10        FREQUENCY=  0

A15         FREQUENCY=  1

      ANT

I15         FREQUENCY=  0

            BLOCK 1    UNIT 1        FREQUENCY=  1


P10         FREQUENCY=  0

PP10        FREQUENCY=  0

            BLOCK 1    UNIT 1        FREQUENCY=  0


L10         FREQUENCY=  0

LL10        FREQUENCY=  0

S10         FREQUENCY=  0

SS10        FREQUENCY=  0

            BLOCK 1    UNIT 3        FREQUENCY=  0
```

```
D10        FREQUENCY=  0

DD10       FREQUENCY=  0

E15        FREQUENCY=  0

           BLOCK 1    UNIT 4       FREQUENCY=  0


M10        FREQUENCY=  0

MM10       FREQUENCY=  0

B10        FREQUENCY=  0

BB10       FREQUENCY=  0

U15        FREQUENCY=  0

           BLOCK 1    UNIT 5       FREQUENCY=  0


R10        FREQUENCY=  0

RR10       FREQUENCY=  0

H10        FREQUENCY=  0

Ø15        FREQUENCY=  0

           BLOCK 1    UNIT 6       FREQUENCY=  0


           TOTAL BLOCK 1      FREQUENCY=  1
```

```
                                   ##########TOTAL WORDS=   14##########

                                   *********************
                                   *   FORTY-WORDS     *
                                   *********************

***************BLOCK 1****************

N10         FREQUENCY=  0

NN10        FREQUENCY=  0

N40         FREQUENCY=  0

T10         FREQUENCY=  0

TT10        FREQUENCY=  0

T40         FREQUENCY=  0

A15         FREQUENCY=  0

A40         FREQUENCY=  0

I15         FREQUENCY=  0

I40         FREQUENCY=  0

            BLOCK 1     UNIT 1        FREQUENCY=  0


P10         FREQUENCY=  0

PP10        FREQUENCY=  0

P40         FREQUENCY=  0

            BLOCK 1     UNIT 2        FREQUENCY=  0
```

```
L10         FREQUENCY=  0

LL10        FREQUENCY=  0

L40         FREQUENCY=  0

S10         FREQUENCY=  0

SS10        FREQUENCY=  0

S40         FREQUENCY=  0

SS40        FREQUENCY=  0

            BLOCK 1    UNIT 3     FREQUENCY=  0


D10         FREQUENCY=  0

DD10        FREQUENCY=  0

D40         FREQUENCY=  0

E15         FREQUENCY=  0

E40         FREQUENCY=  0

            BLOCK 1   UNIT 4      FREQUENCY=  0


M10         FREQUENCY=  0

MM10        FREQUENCY=  0

B10         FREQUENCY=  0

BB10        FREQUENCY=  0

B40         FREQUENCY=  0

U15         FREQUENCY=  0

U40         FREQUENCY=  0

            BLOCK 1    UNIT 5      FREQUENCY=  0
```

```
R10        FREQUENCY=  0

RR10       FREQUENCY=  0

R40        FREQUENCY=  0

H10        FREQUENCY=  0

H40        FREQUENCY=  0

015        FREQUENCY=  0

040        FREQUENCY=  0

           BLOCK 1     UNIT 6      FREQUENCY=  0


           TOTAL BLOCK 1      FREQUENCY=  0


***************BLOCK 2***************




                            #########TOTAL WORDS=   4#########


                              ***********************
                              * WORDS WITH NO RULES *
                              ***********************




CONSTITUTION

SHOVEL
                           #########TOTAL WORDS=   2#########
```

APPENDIX G

SWRL

SOUTHWEST REGIONAL LABORATORY TECHNICAL NOTE

DATE: August 27, 1970

NO: TN 5-70-21

TITLE: CORRECT

AUTHOR: Richard Angilly and Lanaii Kline

ABSTRACT

CORRECT is a file maintenance program designed specifically to update input files for the program WORDLIST.

This document is intended for internal staff distribution and use. Permission to reprint or quote from this working document, wholly or in part, should be obtained from SWRL, 11300 La Cienega Boulevard, Inglewood, California, 90304.

CORRECT

1.0 - PROGRAM IDENTIFICATION

CORRECT

2.0 - OBJECTIVE

The program was written to make corrections to individual records of the input file, ICARD, for the program WORDLIST.

3.0 - PROGRAM DESCRIPTION

3.1 - Program Logic

The program reads one hundred records at a time from input file, ICARD. From the terminal the user enters a number which points to the particular record to be changed (numbers range from 1 to 100). The system writes the record out on the console and waits for acknowledgment stating that the record is the one to be changed. If it is not, then the user enters another record number, and the process continues. Once the record is found, it is replaced by a record entered via the console. To change other records the process is repeated by stating a new record number for the input and by inputting successive groups of one hundred. A "z" is added in column 80 to assure that all records are 80 characters (card images) in length.

3.2 - Variables

IWORD(80,100) - input card images from the file, ICARD.
NAME - a card number from 1 to 100 representing the card to be updated. This variable is entered via the console.

4.0 - SUBROUTINES AND FUNCTIONS

None

5.0 - DATA SPECIFICATIONS

5.1 - Input Formats

File:	ICARD	Variable	Format
	Col 1-80	IWORD	80A1

File: console input
Free form formatting.

5.2 - Output Formats

File:		Variable	Format
NEW	Col 1-80	IWORD	80A1

6.0 - PROGRAM CONSTRAINTS AND LIMITATIONS

6.1 - Language
FORTRAN (Special commands used in the program limits the program to the ITS system)

6.2 - Vendor
International Time Sharing Corporation

6.3 - Storage Requirements
Random Access Disk

6.4 - Hardware Configuration
CDC 3300

6.5 - Program Parameters
The maximum number of records that can be processed at a time is one hundred. For files that have more than one hundred records, the program will read successive groups of one hundred until it finds an end-of-file. The output file name, NEW, must be changed after the program is executed so that it may become input for the WORDLIST program. The new name must be ICARD.

6.6 - Error Messages
None

7.0 - OPERATING INSTRUCTIONS

7.1 - The program is executed via interactive operation through operator intervention at a console.

7.2 - Operator Actions and Program Control Information

s = system response
u = user response
s: "WHICH LINE?"
u: user enters a number from 1 to 100 indicating that record to be changed. This number is read as variable, NAME.
s: The system writes the record indicated to the console.
s: "OK?"
u: Y this is the record to be modified.
N this is not the record to be modified.

If Y, then
s: "NOW GO"

u: enter the corrected record.
*s: "ANOTHER"
u: Y if there are more lines to be modified.
N if there are no more lines in the group of one hundred records to be modified.

If Y, then
s: "WHICH LINE?"
u: user enters a line number, and the process continues.

If N, then
s: "ANY MORE LINES?"
u: Y or N

If Y, then
s: "WHICH LINE?", and the process continues.

If N, then
s: The system processes the one hundred records and writes them on file, NEW. The program then reads another group of one hundred, and the process continues.

If N, then
s: "ANOTHER"
u: Y or N and the user continues as above (*).

7.3 - Sample data see Attachment 1.

7.4 - Sample run
See section 7.2 for example of sample run. The program updates the data base, ICARD, and writes the updated version on a tape.

8.0 - PROGRAM FLOWCHART

Not available.

```
      PROGRAM CORRECT
      DIMENSION IWORD(80,100)
      OPEN(2),INPUT,ICARD
      OPEN(3),OUTPUT,NEW
      IT=0000
      IEND=0
 15   TYPE,"WHICH LINE?"
      ACCEPT,NAME
  5   DO 100 I=1,100
      READ(2,10),(IWORD(N,I),N=1,80)
 10   FORMAT(80A1)
      IF END RECORD 2,250
100   CONTINUE
      IT=IT+100
 60   IF(IT-NAME)50,150,150
 50   IF(IEND-1)70,55,70
 55   DO 130 J=1,(I-1)
      IF(IWORD(80,J)-"E")56,57,56
 56   IWORD(80,J)="Z"
 57   WRITE(3,10),(IWORD(N,J),N=1,80)
130   CONTINUE
      GO TO 300
 70   WRITE(1,25),IT
 25   FORMAT(10X,I4)
      DO 125 I=1,100
      IF(IWORD(80,I)-"E")120,110,120
120   IWORD(80,I)="Z"
110   WRITE(3,10),(IWORD(N,I),N=1,80)
125   CONTINUE
      GO TO 5
150   IF(IEND-1)160,170,170
170   J=NAME-(IT-I)
      GO TO 180
160   J=NAME-(IT-100)
180   WRITE(1,10),(IWORD(N,J),N=1,80)
      TYPE,"OK?"
      ACCEPT 99,NOW
 99   FORMAT(A1)
      IF(NOW-"Y")75,200,75
200   TYPE,"   NOW GO"
      READ(0,10),(IWORD(N,J),N=1,80)
 75   TYPE,"ANOTHER"
      ACCEPT 199,LOW
199   FORMAT(A1)
      IF(LOW-"Y")220,230,220
230   TYPE,"WHICH LINE?"
      ACCEPT,NAME
      GO TO 60
220   TYPE,"ANY MORE LINES ?"
      ACCEPT 299,MOW
299   FORMAT(A1)
      IF(MOW-"Y")225,230,225
225   NAME=6000
      GO TO 60
250   IT=IT+I
      WRITE(1,240),IT
240   FORMAT(10X,"END="I4,/)
      IEND=1
      GO TO 60
300   END
```

Attachment 1

ICARD
database

```
6 ABSENCE            A16,B10,S10,E17,N10,C11,E18                       1
N
6 ABUSE              A17,B10,U11,S40,E18                               2
N
6 ABUSE              A17,B10,U11,S20,E18                               2
V
6 ACHE               A40,CH31,E18                                      0
N,V
6 ACTIØN             A16,C12                                           1
N     E
6 CØNSTITUTIØN
N
6 ANGLE              A16,N20,G12,LE22                                  3  2
N                                   3
6 ANT                A15                                               0
N
6 BØW                B40,ØW40                                          0
N,V
6 CUTE               C12,U11,T10,E18                                   3
AJ    P
6 EARRING            EA11,RR10,I15,NG10                                1  3
N                                   4
6 EDGE               E13,D10,G19,E18                                   0
N,V
6 GET                G31,E15,T40                                       0
V      E
6 GUARD              G12,U20,A21,R10,D10                               4
N,V
6 HØUSE              H10,ØU10,S21,E18                                  0
N
6 INVITE             I16,N10,V10,I11,T10,E18                           2
V
6 RING               R10,I15,NG10                                      0
N,V
6 RØB                R 0,Ø15,B10                                       1
V
6 SEPARATE           S10,E40,P10,A32,R10,A17,T10,E18                   0
AJ    P
6 SHE                SH10,E25                                          3
PN
6 SHØVEL
N,V
6 STRANGE            S10,T10,R10,A40,N10,G11,E18                       0
AJ
6 UNDER              U16,N10,D10,E21,R10                               1
AV,PP
6XYØLK               Y10,Ø23,L20,K10,                                  0
N
```

```
6 ABSENCE          A16,B10,S10,E17,N10,C11,E18             1   N

6 ABUSE            A17,B10,U11,S40,E18                     2   N

6 ABUSE            A17,B10,U11,S20,E18                     2   V

6 ACHE             A40,CH31,E18                            0   N
V
6 ACTIØN           A16,C12                                 1   N
 E
6 ADDITIØN                                                     N

6 ANGLE            A16,N20,G12,LE22                        3 23N

6 ANT              A15,N10,T10                             0   N

6 BØW              B40,ØW40                                0   N,
                              V
6 CUTE             C12,U11,T10,E18                         3   AJ
 P
6 EARRING          EA11,RR10,I15,NG10                      1 34N

6 EDGE             E13,D10,G19,E18                         0   N,
                              V
6 GET              G31,E15,T40                             0   V
  E
6 GUARD            G12,U20,A21,R10,D10                     4   N,
                              V
6 HØUSE            H10,ØU10,S21,E18                        0   N

6 INVITE           I16,N10,V10,I11,T10,E18                 2   V

6 RING             R10,I15,NG10                            0   N,
                              V
6 RØB              R 0,Ø15,B10                             1   V

6 SEPARATE         S10,E40,P10,A32,R10,A17,T10,E18,        0   A
   P                          J
6 SHE              SH10,E25                                3   PN

6 SHØVEL                                                       N
V                             ,
6 STRANGE          S10,T10,R10,A40,N10,G11,E18             0   A
                              J
6 UNDER            U16,N10,D10,E21,R10                     1   AV
PP                            ,
6XYØLK             Y10,Ø23,L20,K10,                        0   N
```

APPENDIX H

SWRL SOUTHWEST REGIONAL LABORATORY
TECHNICAL NOTE

DATE: August 6, 1970
NO: TN-2-70-34

REGULAR AND IRREGULAR PRONUNCIATIONS OF GRAPHEMES

Betty Berdiansky and George Stanton

ABSTRACT

A complete listing is given of the various pronunciations of each grapheme in the SWRL reading program. These graphemes are also ordered according to pronunciation variability. The data specifically itemizes the low variability of English graphemes, and indicates the extent to which each grapheme's rules can be compressed for an overview of pronunciations. Based on this information, suggestions are also proposed for revisions in rule numbering, with particular attention given to irregular rules.

---

[1] Section III, regarding rule revisions, of this Technical Note has been deleted for purposes of this Appendix.

This document is intended for internal staff distribution and use. Permission to reprint or quote from this working document, wholly or in part, should be obtained from SWRL, 11300 La Cienega Boulevard, Inglewood, California, 90304.

REGULAR AND IRREGULAR PRONUNCIATIONS OF GRAPHEMES

The SWRL Reading Program incorporates two types of spelling-to-sound rules of correspondence. The first type, "regular" rules, has predictable pronunciations usually occurring in specifiable environments. The second type, "irregular" rules (numbered as Rule "40"[1]), identifies correspondences considered too unproductive to be classified as regular rules, or exceptions to regular rules. An irregular correspondence of this latter type is one with a pronunciation not already covered by a regular rule, or one with a regular pronunciation occurring in an environment different from that specified by the regular rule.

This paper is divided into three sections with the following purposes: 1) Section I specifies the number and nature of the pronunciations covered by the regular rules and the "40" (i.e., irregular) rules for each grapheme; 2) Section II lists the graphemes having just one or two pronunciations, separately from those which are less predictable; and 3) Section III suggests improved classifications of the "40" rules and possible changes of some "40" rules to regular rules.

Most Consonant and Secondary Vowel graphemes have only one or two regular pronunciations. And for all Consonants but NG, S, and TH, and for all Secondary Vowels but IE, there is only one regular rule per pronunciation. Primary Vowels, however, each have an average of 6 regular pronunciations covered by 13 rules. Consonants and Secondary Vowels have an average of one or two irregular pronunciations. These "40" rule correspondences involve pronunciations other than those covered by regular rules, except in a minority of cases where one and occasionally two of the "40" pronunciations are the same as regular rules but occur in different environments. Primary vowels, on the other hand, have an average of 7 irregular proncunciations, one-half of which are the same as those accounted for by regular rules; they are irregular in that they occur in different environments.

Confronted with the large number of correspondence rules (166, although many of the vowel rules could be combined and then generalized across the Primary Vowels), and faced with the environmental details specified by the rules, the learner might lose sight of the degree to which the most important information to be gained about each grapheme--its pronunciation(s)--can be condensed from rules information. Another aspect of this grapheme pronunciation overview that the learner might not deduce is that the pronunciation variability is much lower for both Consonants and Secondary Vowels than for Primary Vowels, and that he will, therefore, have to concentrate more on enviornment specifications of the Primary Vowel rules for indications of correct pronunciations than he will for other rules.

---

[1] An explanation of the numbering system devised for the rules of correspondence is given in TR15, Berdiansky, Cronnell, & Koehler, 1969, Spelling-sound relations and primary form-class descriptions for speech-comprehension vocabularies of 6-9 year-olds, p. 13.

Section I

Regular and "40" Rule Pronunciations

In Section I, Consonants, Primary Vowels, and Secondary Vowels are listed alphabetically. In brackets, on the same line as each grapheme, are listed all of that grapheme's possible pronunciations. A pronunciation is listed only once per grapheme even if it is covered by more than one of the grapheme rules.

Also listed is the pronunciation(s) for each regular rule, and one example (in capital letters) with the appropriate grapheme underlined. The Block and Unit position of the regular rules in the Sequence of Correspondences is given (e.g., Rule B10 first receives instruction in Block 1, Unit 5).

All base forms of "40" words (irregular words) are listed after the appropriate pronunciations. In order to have a comprehensive list of pronunciations for each grapheme, irregular nonlexicon pronunciations and exemplars are included (and asterisked). Some of these exemplars will also be considered for inclusion in future expanded lexicon studies of correspondence rules.

CONSONANTS

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
B		[b], [Ø]		
	10	[b]	BOY	1,5
	20	[Ø]	COMB	19,4
	40	[Ø]	debt, doubt	
BB		[b]		
	10	[b]	BUBBLE	1,5
C		[s], [k], [č], [š]		
	11	[s]	CITY	7,1
	12	[k]	CAT	4,2
	40	[š]	licorice, ocean, species	
		[s]	muscle	
	E	[š]	special, social gracious, precious, spacious, vicious glacier	
		[č]	ancient conscience, conscious	
CC	11	[k], [ks]	ACCENT	20,4
	12	[k]	HICCUP	11,5
	C12,C11	[ks]	ACCENT, ACCEPT, SUCCEED, SUCCESS	19,4
CH		[č], [k], [š], [Ø]		

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
CH (con't)	10	[č]	CHEAP	11,2
	31	[k]	SCHOOL	20,2
	40	[š]	chalet, chamois, champagne, chauffeur, chef, chute, crochet, machine, moustache, mustache, sachet	
		[Ø]	yacht	
CK		[k]		
	10	[k]	KICK	4,2
D		[d], [t], [Ø], [ǰ]		
	10	[d]	DID	1,4
	40	[t]	chapped, mashed, touched; unwashed	
		[Ø]	adjoin, adjourn, adjust, grandma, grandpa, handsome	
		[ǰ]	schedule	
	E	[ǰ]	cordial, soldier	
DD		[d]		
	10	[d]	SUDDEN	1,4
F		[f], [v]		
	10	[f]	FUN	4,1
	40	[v]	of	

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
FF		[f]		
	10	[f]	OFF	4,1
G		[ǰ], [g], [Ø], [ž]		
	11	[ǰ]	AGE	7,1
	12	[g]	GO	4,3
	31	[g]	GET	11,6
	40	[Ø]	assign, campaign, champagne, cologne, design, ensign, foreign, gnat, gnaw, reign, resign, sign, sovereign	
		[ǰ]	judgment	
		[ž]	rouge	
GG		[g], [gǰ]		
	10	[g]	EGG	11,5
	G12,G11	[gǰ]	suggest	11,5
GH		[Ø], [f], [g]		
	10	[Ø]	HIGH	19,2
	40	[f]	cough, draught, enough, laugh, laughter, rough, tough, trough	
		[g]	ghost	

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
H		[h], [Ø]		
	10	[h]	HOME	1,6
	20	[Ø]	HUH	19,2
	40	[Ø]	dahlia, exhaust, gingham, graham, heir, heiress, herb, homage, honor, hour, khaki, rajah, rhinestone, rhubarb, rhyme, rhythm, shepherd	
J		[ǰ], [h] or [Ø], [y]*		
	10	[ǰ]	JOY	4,4
	40	[h] or [Ø]	frijoles, marijuana*	
		[y]*	hallelujah*	
K		[k], [Ø]		
	10	[k]	MILK	4,1
	20	[Ø]	KNOT	19,3
L		[l], [Ø], [r]		
	10	[l]	LIKE	1,3
	20	[Ø]	WALK	19,5

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
L (con't)	40	[Ø]	could, Lincoln, should, solder would	
		[r]	colonel	
LL		[l], [y]		
	10	[l]	FILL	1,3
	40	[y]	tortilla	
LE		[əl]		
	22	[əl]	LITTLE	10,2
M		[m], [Ø]*		
	10	[m]	MAN	1,5
	40	[Ø]*	mneumonic*, comptroller*	
MM		[m]		
	10	[m]	SUMMER	1,5
N		[n], [ŋ], [Ø], [ñ]		
	10	[n]	NO	1,1
	20	[ŋ]	SINK	4,1
	40	[n]	concrete, engage, incline, inclose, include, income, increase, inquire	

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
N (con't)		[∅]	autumn, column, condemn, damn, hymn, solemn, monsieur	
		[ñ]	señor	
NN		[n]		
	10	[n]	INNER	1,1
NG		[ŋ], [ŋg], [nǰ]		
	10	[ŋ]	SING	5,5
	N20,G12	[ŋg]	ANGRY, England, English, language, penguin	10,2
	N20, G31	[ng]	ANGER	11,6
	N10, G11	[nǰ]	DINGY, dungeon, vengence	10,2
	40	[ŋ]	length, strength, tongue	

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
P		[p], [0]		
	10	[p]	POP	1,2
	40	[0]	clapboard, corps, cupboard, psalm, receipt, sapphire	
PP		[p]		
	10	[p]	APPLE	1,2
PH		[f], [p]		
	10	[f]	PHONE	20,2
	P10,H40	[p]	shepherd	
QU		[kw], [k]		
	10	[kw]	QUICK	11,4
	40	[k]	antique, bouquet, conquer, croquet, lacquer, liquor, mesquite, mosque, plaque, queue, unique	
R		[r], [ɚ]		
	10	[r]	RUN	1,6
	40	[ɚ]	acre, ogre	

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
RR		[r]		
	10	[r]	HURRY	1,6
S		[s], [z], [Ø], [š], [ž], [č]		
	10	[s]	SUN	1,3
	20	[z]	NOSE	18,2
	21	[s]	HOUSE	18,2
	31	[z]	WIVES	7,2
	40	[s]	abuse, aside, basin, basis, bison, close, crusade, decrease, dose, excuse, geese, lease, mason, mesa, nuisance, porpoise, promise, purpose, research, resource, sausage, tortoise, usage, use, valise, vise	
		[z]	absorb, as, cleanse, clumsy, cosmos, dismal, has, his, husband, is, jersey, measles, muslin, observe, pansy, plasma, Thursday, Tuesday, was, Wednesday, wisdom	
		[Ø]	aisle, chamois, corps, island, isle	
		[š]	catsup, insure, sugar, sure	

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
S (con't)	E	[č]	conscience, conscious	
		[ž]	Asia vision measure, pleasure, treasure	
		[š]	mansion, pension, tension	
SS		[s], [š], [z]		
	10	[s]	MESS	1,3
	40	[š]	issue, tissue	
		[z]	dessert, dissolve, possess, scissors	
	E	[š]	Russian mission, session assure, pressure	
SH		[š]		
	10	[š]	RUSH	2,1
T		[t], [Ø], [č], [š]		
	10	[t]	TEN	1,1
	20	[Ø]	OFTEN	19,5
	40	[Ø]	ballet, bouquet, buffet, chalet, chestnut, Christmas, crochet, croquet, depot, mortgage, sachet, valet	
		[č]	natural, statue	

GRAPEHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
T (con't)	E	[č]	righteous Christian question fortune capture, creature, culture, feature, fixture, fracture, future, lecture, mixture, moisture, nature, pasture, picture, posture, puncture, rapture, sculpture, stature, structure, torture, venture, vulture	
		[č] or [t]	mature	
		[š]	partial patience patient, quotient ratio cautious action, auction, caution, diction, faction, fiction, fraction, friction, junction, mention, motion, nation, notion, portion, potion, section, station, traction	
TT		[t]		
	10	[t]	LITTLE	1,1
TCH		[č]		
	10	[č]	MATCH	11,2
TH		[θ], [ð], [∅], [t]		
	11	[θ]	THIN	2,2
	12	[ð]	FATHER	20,3

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
TH (con't)	13	[ð]	THIS	2,1
	40	[ð]	clothing, fathom, heathen, rhythm, smooth, swarthy, worthy	
		[θ]	ether, panther	
		[0]	asthma*, clothes, isthmus	
		[t]*	thyme*	
V		[v]		
	10	[v]	VERSE	4,5
W		[w], [0]		
	10	[w]	WET	4,1
	20	[0]	WRONG	19,3
	40	[0]	answer, sword, two	
WH		[w] or [hw], [h]		
	10	[w] or [hw]	WHEN	11,3
	40	[h]	who, whole, wholly, whom, whose	
X		[ks], [gz], [z], [kš]		

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
X (con't)	10	[ks]	BOX	4,4
	40	[gz]	exact, exalt, exam, exert, exhaust, exist	
		[z]	xylophone*, xerox*	
	E	[kš]	anxious	
Y		[y]		
	10	[y]	YES	4,4
Z		[z], [s], [Ø], [ž]		
	10	[z]	ZOO	4,5
	40	[s]	waltz	
		[Ø]*	rendezvous*	
	E	[ž]	glazier	
ZZ		[z], [ts]		
	10	[z]	BUZZ	4,5
	40	[ts]	pizza	

PRIMARY VOWELS

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
A		[e], [æ], [ə] or [I], [a], [ɔ] [ɛ] or [æ], [a] or [ɔ], [o], [Ø]		
	11	[e]	NAME	6,1
	12	[e]	ACRE	25,4
	13	[e]	BABY	18,1
	14	[e]	APRIL	25,5
	15	[æ]	SAT	1,1
	16	[æ]	JACKET	8,2
	17	[ə] or [I]	METAL	10,1
	21	[a]	CAR	9,1
	22	[ɛ] or [æ]	MARRY	18,3
	23	[ɔ]	BALL	13,2
	24	[a] or [ɔ]	WAD	23,1
	25	[o]	WAR	9,3
	29	[e]	PASTE	23,1
	32	[Ø]	SEPARATE	27,6
	38	[æ]	CAVERN	24,2
	40	[e]	a, ache, ancient, bass, bathe, chamber, champagne hasten, hasty, paster, pastry, sundae, tasty	
		[æ]	acid, adenoid, agate, atom, baboon, balance, banish, cabin, cafe, camel, camera, chalet, chamois, chapel, comrade, damage,	

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
A	40 (con't)		dragon, famine, fragile, granite, habit, khaki, Latin, madam, magic, malice, manage, pageant, palace, panel, panic, papoose, patent, planet, plaque, plateau, plaza, radish, rapid, salad, satin, saturn, shadow, shall, shallow, spaniel, Spanish, statue, stature, strata, swam, taboo, talent, trapeze, vacuum, valet, valor, value, vanish, wagon	
		[a]	ah, aha, almond, amen are, baa, bah, bazaar, calm, drama, father, garage, grandma, grandpa, ha, hurrah, la, lava, llama, ma, pa, palm, psalm, rajah, yacht, yah	
		[ɔ]	almost, alright, also, although, always, false, walnut, walrus	
		[ɛ]	any, many	
		[ə]	was, what	
E		[i], [ɛ], [ə] or [I], [ə], [Ø], [e], [I] or [U]		
	11	[i]	HERE	6,2
	13	[i]	HERO	18,1
	14	[i]	ZEBRA	25,5
	15	[ɛ]	SET	1,4
	16	[ɛ]	EXTRA	8,2
	17	[ə] or [I]	HIDDEN	10,1

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITON IN SEQUENCE
E (con't)	18	[Ø]	NAME	6,1
	19	[Ø]	WIVES	7,2
	21	[ə]	HERD	9,1
	25	[i]	WE	3,1
	26	[i]	CREATE	25,2
	32	[Ø]	SEVERAL	27,6
	38	[ɛ]	EXIT	25,2
	40	[i]	ether, people, recharge	
		[ɛ]	allege, celery, chemist, cherish, credit, decade, deluge, desert, emerald, ere, federal, general, generous, herald, heron, legend, lemon, leopard, medal, melon, menace, menu, metal, nowhere, pedal, peril, perish, petal, precious, preface, presence, present, rebel, record, reference, refuge, relic, schedule, second, senate, señor, separate, sheriff, special, tenant, there, very, veteran, where	
		[e]	ballet, bouquet, buffet, cafe, chalet, crepe, crochet, croquet, fete, mesa, re, sachet, valet	
		[Ø]	chauffeur, dungeon, Europe, grandeur, luncheon, monsieur, pigeon, queue, surgeon, Wednesday, yeoman	
		[ə]	the, were	
		[I]	England, English	
		[I] or [U]	pretty	

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
I		[ay], [I] or [ə], [I], [ə], [y], [0], [i]		
	11	[ay]	FINE	6,1
	12	[ay]	IDLE	25,4
	13	[ay]	CIDER	18,1
	14	[ay]	IDLY	25,5
	15	[I]	SIT	1,1
	16	[I]	LITTLE	8,2
	17	[ə] or [I]	OFFICE	10,1
	21	[ə]	BIRD	9,1
	22	[ay]	FIND	13,3
	24	[ay]	HIGH	19,2
	25	[y]	ONION	23,2
	26	[ay]	LIAR	25,2
	32	[0]	ASPIRIN	27,6
	38	[I]	RIVER	24,2
	40	[ay]	Christ, cipher, climb, hi, I, island, ninth, pint, siphon	
		[I]	city, chili, clinic, figure, finish, frigid, guinea, guitar, image, liberal, licorice, lily, limit, linen, liquid, liquor, lizard, mimic, minute, pigeon, pity, primer, prison, risen, sinew, spigot, spinach, spirit, timid, tribute, vicious, vigor, vineyard, vision, visit, widow, wind, wizard	

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITON IN SEQUENCE
I	40 (con't)	[i]	antique, chili, chlorine, fatigue, fiord, Hopi, khaki, machine, marine, mesquite, mi, mobile, pizza, police, ravine, sardine, ski, suite, taxi, ti, unique, vaccine, valise	
		[Ø]	business, fashion, legion, marriage, region	
O		[o], [a], [ə] or [I], [ə], [I], [Ø], [a] or [o] or [ɔ], [ɔ] or [a], [u], [U], [wə], [ɚ]		
	11	[o]	HOME	6,2
	12	[o]	NOBLE	25,4
	13	[o]	NOTICE	18,1
	14	[o]	ONLY	25,5
	15	[a]	LOT	1,6
	16	[a]	HOCKEY	8,2
	17	[ə] or [I]	COTTON	10,1
	21	[a] or [o] or [ɔ]	HORN	9,1
	22	[ə]	WORD	9,3
	23	[o]	GOLD	13,2
	24	[ɔ] or [a]	SONG	13,3
	25	[o]	GO	18,4

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
O (con't)	26	[o]	POEM	25,2
	31	[ə]	WON	13,1
	32	[Ø]	SOPHOMORE	27,6
	38	[a]	NOVEL	24,2
	40	[o]	almost, both, clothe, clothes, cologne, comb, control, crochet, depot, ghost, gopher, gross, holster, host, hostess, most, O, oh, patrol, post, postage, postal, poster, postpone, sol, soldier, trophy, utmost, wholly	
		[a]	body, chocolate, chronic, closet, column, comet, copy, frolic, homage, honest, honor, model, modern, modest, monarch, olive, phonic, polish, process, product, profit, project, promise, proper, robin, rosin, scholar, solemn, solid, tonic, topic, tropic, volume, vomit	
		[u]	do, improve, lose, move, movie, prove, remove, to, tomb, two, who, whom, whose	
		[Ø]	colonel, iron, leopard, people	
		[a] or [ɔ]	begone, golf, gone, swollen	
		[U]	bosom, wolf, wolves, woman	
		[wə]	once, one	

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
O	40 (con't)	[I]	women	
		[ɚ]	colonel	
		[ə] or [u] or [Ø]	toward	
U		[(y)u], [ə], [Ø], [ə] or [I], [U], [ɛ], [I], [w]		
	EAU	[o] or [yu]		
	11	[(y)u]	USE	6,2
	12	[(y)u]	BUGLE	25,4
	13	[(y)u]	UNIT	18,1
	14	[(y)u]	BUGLER	25,5
	15	[ə]	GUM	1,6
	16	[ə]	SUDDEN	8,2
	17	[ə] or [I]	LETTUCE	10,1
	20	[Ø]	GUARD	19,6
	21 (formerly U15 & U16 /__r)	[ə]	BURN	9,1
	26	[(y)u]	RUIN	25,6
	31	[U]	PUSH	13,1
	32	[Ø]	NATURAL	27,6
	40	[w]	jaguar, language, penguin, persuade, pueblo, suite	

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITON IN SEQUENCE
U	40 (con't)	[ə]	punish, study, suburb	
		[u]	cuckoo, flu, truth	
		[yu]	menu, vacuum	
		[I]	business, busy	
		[Ø]	buy, disguise	
		[ɛ]	bury	
		[U]	sugar	
EAU	U40 + EA40	[o]	beau, bureau, plateau	
		[yu]	beauty	
Y		[ay], [I], [i] or [I], [ə], [ə] or [I]		
	11	[ay]	RHYME	23,3
	15	[I]	MYTH	23,3
	17	[i] or [I]	BABY	10,2
	19	[ay]	TRY	3,2
	40	[ay]	bye, dye, hyphen, lye, rye, scythe, typhoid, typhoon	
		[I]	physics, Plymouth	
		[ə]	martyr, myrrh	
		[ə] or [I]	syrup	

SECONDARY VOWELS

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
AI		[e], [ə] or [I], [ɛ], [ay], [æ]		
	10	[e]	RAIN	16,1
	17	[ə] or [I]	CAPTAIN	26,3
	40	[ɛ]	again, said	
		[ay]	aisle, kaiak	
		[æ]	plaid	
AY		[e], [ay]		
	11	[e]	DAY	12,1
	40	[ay]	aye	
AU		[ɔ], [æ] or [s], [æ], [o], [Ø]		
	10	[ɔ]	CAUSE	16,4
	40	[æ] or [a]	aunt	
		[æ]	draught, laugh laughter	
		[o]	chauffeur	
		[Ø]	restaurant	
AW		[ɔ]		
	10	[ɔ]	SAW	16,4
EA		[i], [ɛ], [ə] or [I], [ə], [e], [a]		
	EAU:	[o], [yu]		

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
EA (con't)	11	[i]	EACH	12,2
	31	[ɛ]	DEAF	12,2
	33	[ə]	EARN	26,4
	40	[e]	break, great, steak, yea	
		[a]	heart, hearth	
		[ə] or [I]	ocean, pageant, sergeant, vengeance	
EAU	EA40 + U40	[o]	beau, bureau, plateau	
		[yu]	beauty	
EE		[i], [I], [e]*		
	10	[i]	SEE	3,1
	40	[I]	been, breeches, creek	
		[e]*	matinee*, melee*	
EI		[i], [e], [I], [ay], [ɛ]		
	10	[i]	CEILING	26,5
	20	[e]	NEIGHBOR	26,6
	40	[I]	foreign, forfeit	
		[ay]	height	
		[ɛ]	heifer, heir, heiress, their	
		[e]	veil	

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
EW		[(y)u], [o]		
	10	[(y)u]	NEW	16,6
	40	[o]	sew	
EY		[e], [i], [ay]		
	10	[e]	OBEY	26,6
	17	[i]	MONEY	26,2
	40	[ay]	eye, geyser	
		[i]	key	
IE		[ay], [i], [ɛ], [I], [I] or [ə]		
	11	[ay]	DIE	19,2
	12	[i]	FIELD	26,5
	17	[i]	MOVIE	26,2
	40	[ɛ]	friend	
		[I]	sieve	
		[I] or [ə]	kerchief, mischief	
OA		[o], [ɔ], [ə]		
	10	[o]	COAT	16,3
	40	[ɔ]	abroad, broad, broadcast	
		[ə]	clapboard, cupboard	

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
OE		[o], [u], [ə]		
	10	[o]	TOE	16,3
	40	[u]	canoe, shoe	
		[ə]	does	
		[o]	goes	
OI		[oy], [i], [way], [ə] or [I]		
	10	[oy]	NOISE	16,5
	40	[i]	chamois	
		[way]	choir	
		[ə] or [I]	porpoise, tortoise	
OO		[u], [U], [ə], [o]		
	11	[u]	TOOL	12,3
	12	[U]	BOOK	12,3
	40	[ə]	blood, flood	
		[o]	door, floor	
OU		[aw], [ə], [(y)u], [ɔ], [o], [U]		
	10	[aw]	COUNT	16,2
	31	[ə]	YOUNG	26,7
	33	[(y)u]	GROUP	26,7
	34	[ɔ]	FOUGHT	26,7
	35	[o]	SOUL	26,7

GRAPHEME UNIT	RULE NUMBER	PRONUNCIATIONS	EXAMPLE	POSITION IN SEQUENCE
OU (con't)	40	[U]	could, should, would	
OW		[o], [o] or [ə], [aw], [a]		
	11	[o]	GLOW	12,4
		[o] or [ə] in unstressed syllables	YELLOW	
	12	[aw]	NOW	12,4
	40	[a]	knowledge	
OY		[oy], [i]		
	10	[oy]	BOY	16,5
	40	[i]	buoy	
UE		[(y)u], [Ø]		
	10	[(y)u]	BLUE	16,6
	40	[Ø]	fatigue, league, plague, queue, rogue, tongue	
UI		[(y)u], [I]		
	10	[(y)u]	FRUIT	16,6
	31	[I]	BUILD	26,8
gw				

Section II

Graphemes Grouped According to Pronunciation Variability

The purpose of grouping graphemes by their degree of pronunciation variability was to determine which graphemes could, instructionally, have just one or two pronunciations associated with them with little or no emphasis on environmental information, and which would require information about the position of the grapheme in that exemplar to determine the pronunciation.

Five categories of pronunciation variability are listed. Beginning with graphemes having invariant pronunciations, the categories are presented in order of increasing grapheme pronunciation variability. Within each category, the order of graphemes is: single consonants, geminate consonants, digraphs, primary vowels, and secondary vowels. These subgroups are separated by a dotted line.

If a grapheme has irregular correspondences with pronunciations not covered by that grapheme's regular rules, these particular exemplars are listed. No regular words, and no "40" words having the same pronunciation as regular rules, are listed.

In order to have a comprehensive list of pronunciations for each grapheme, irregular nonlexicon pronunciations and exemplars are included (and asterisked).

The data indicates that geminate consonants are invariant or very nearly so, with the only exception being SS, which has one major pronunciation and two minor ones. Single consonants tend to have a major pronunciation with a few irregular exemplars, or to have a major pronunciation and a secondary pronunciation. The only consonants which could not be fit into this description (by acknowledging automatic selection by the reader of the correct allophones for D and N, for example) are C, G, S, and T. Consonant digraphs have one or sometimes two pronunciations, with the exceptions being CH and NG (and the latter's pronunciation depends on environment). Secondary Vowels have one or two pronunciations, except for EA and OU which each have more than three common pronunciations. Primary Vowels are highly variant, with an average of seven pronunciations.

INVARIANT PRONUNCIATIONS

M	[m]	
	[Ø]*	mneumonics*, comptroller*
V	[v]	

BB	[b]	
DD	[d]	
FF	[f]	
MM	[m]	
NN	[n]	
PP	[p]	
RR	[r]	
TT	[t]	

CK	[k]	
LE	[əl]	
SH	[š]	
TCH	[č]	

AW	[ɔ]	

ONE MAJOR PRONUNCIATION WITH 1-6 EXCEPTIONS

F	[f]	
	[v]	of
J	[ǰ]	
	[h] or [∅]	frijoles, marijuana*
	[y]*	hallelujah*
R	[r]	
	[ɚ]	acre, ogre
Z	[z]	
	[s]	waltz
	[ž]	glazier
	[∅]*	rendezvous*

CC	[k]	
	[ks]	accent, accept, succeed, success
GG	[g]	
	[gj]	suggest
LL	[l]	
	[y]	tortilla
ZZ	[z]	
	[ts]	pizza

PH	[f]	
	[p]	shepherd
WH	[w] or [hw]	
	[h]	who, whole, wholly, whom, whose

AU	[ɔ]	
	[æ] or [a]	aunt
	[æ]	laugh
	[o]	chauffeur
	[∅]	restaurant
AY	[e]	
	[ay]	aye
EE	[i]	
	[I]	been, breeches, creek
	[e]*	matinee*, melee*
EW	[(y)u]	
	[o]	sew
OA	[o]	
	[ɔ]	broad
	[ə]	clapboard, cupboard
OE	[o]	
	[u]	canoe, shoe
	[ə]	does
OI	[oy]	
	[i]	chamois
	[way]	choir
	[ə] or [I]	propoise, tortoise
OY	[oy]	
	[i]	buoy
UE	[(y)u]	
	[∅]	fatigue, league, plague, queue, rogue, tongue

TWO PRONUNCIATIONS

B	[b]	
	[Ø]	
H	[h]	
	[Ø]	
K	[k]	
	[Ø]	
P	[p]	
	[Ø]	clapboard, corps, cupboard, psalm, receipt, sapphire, pseudo,* psychology,* pneumonia,* ptomaine*
W	[w]	
	[Ø]	
X	[ks]	
	[gz]	exact, exalt, exam, exert, exhaust, exist,
	[z]*	xylophone,* xerox*
QU	[kw]	
	[k]	antique, bouquet, conquer, croquet, lacquer, liquor mesquite, mosque, plaque, queue, unique
UI	[(y)u]	
	[I] or [ə]	

TWO PRONUNCIATIONS WITH 1-6 EXCEPTIONS

L	[l]	
	[Ø]	
	[r]	colonel

GH	[Ø]	
	[f]	cough, draught, enough, laugh, laughter, rough, tough, trough
	[g]	ghost
TH	[θ]	
	[ð]	
	[Ø]	clothes, isthmus, asthma*
	[t]*	thyme*

AI	[e]	
	[ə] or [I]	
	[ɛ]	again, against, said
	[ay]	aisle, kaiak
	[æ]	plaid
EI	[i]	
	[e]	
	[I]	foreign, forfeit
	[ay]	height
	[ɛ]	heifer, heir, their
EY	[e]	
	[i]	
	[ay]	eye, geyser
IE	[ay]	
	[i]	
	[ɛ]	friend
	[I]	sieve
	[I] or [ə]	kerchief, mischief
OO	[u]	
	[U]	
	[ə]	blood, flood
	[o]	door, floor
OW	[o]	
	[aw]	
	[a]	knowledge

THREE OR MORE PRONUNCIATIONS

C	[k]	
	[s]	
	[č]	"E" words
	[š]	licorice, ocean, species, + "E" words
D	[d]	
	[t]	chapped, mashed, touched, unwashed
	[Ø]	adjorn, adjourn, adjust, grandma, grandpa, handsome,
	[ǰ]	schedule, soldier
G	[g]	
	[ǰ]	
	[Ø]	assign, campaign, champagne, cologne, design, ensign, foreign, gnat, gnaw, reign, resign, sign,
	[ž]	rouge
N	[n]	
	[ŋ]	
	[Ø]	autumn, column, condemn hymn, solemn, monsieur
	[ñ]	señor
S	[s]	
	[z]	
	[š]	catsup, insure, sugar, sure, + "E" words
	[ž]	"E" words
	[Ø]	aisle, chamois, corps, isle
T	[t]	
	[Ø]	
	[č]	natural, statue, + "E" words
	[š]	"E" words

SS	[s]	
	[z]	dessert, dessolve, possess, scessors
	[š]	issue, tissue, + "E" words

CH	[č]	
	[k]	
	[š]	chalet, chamois, champagne, chauffeur, chef, chute, crochet, machine, moustache, mustache, sachet
	[Ø]	yacht
NG	[ŋ]	
	[ŋg]	N20,G12 words, N20,G31 words
	[nǰ]	N10,G11 words
	[nž]*	lingerie*

A	[æ]	
	[e]	
	[a]	
	[ə] or [I]	
	[ɔ]	
	[ɛ]	
	[o]	
	[Ø]	
	[ə]	was, what
E	[ɛ]	
	[i]	
	[ə] or [I]	
	[Ø]	
	[e]	ballet, bouquet, buffet, cafe, chalet, crepe, crochet, croquet, fete, mesa, re, sachet, valet
	[I] or [U]	pretty
	[e] or [ɛ]	ere, where

Three or more pronunciations (con't)

I	[I]	
	[ay]	
	[ə] or [I]	
	[ə]	
	[y]	
	[Ø]	
	[i]	antique, chili, chlorine, fatigue, fiord, Hopi, khaki, machine, marine, mesquite, mi, mobile, pizza, police, ravine, sardine, ski, suite, taxi, ti, unique, vaccine, valise
O	[a]	
	[o]	
	[ə]	
	[ɔ]	
	[Ø]	
	[ə] or [I]	
	[ɔ] or [a]	
	[a], [o] or [ɔ]	
	[u]	do, improve, lose, move, movie, prove, remove, to, tomb, two, who, whom, whose
	[U]	wolf, woman, bosom
	[wə]	one, once
	[I]	women
	[ɚ]	colonel
	[ə] or [u] or [Ø]	toward
U	[(y)u]	
	[ə]	
	[Ø]	
	[ə] or [I]	
	[U]	
	[ɛ]	bury
	[I]	business, busy
	[w]	jaguar, language, penquin, persuade, pueblo, suite
EAU	[o]	beau, bureau, plateau
	[yu]	beauty

Y	[ay]	
	[i]	
	[i] or [I]	
	[ə]	martyr, myrrh
	[ə] or [I]	syrup

EA	[i]	
	[ɛ]	
	[ə]	
	[e]	break, great, steak, yea
	[a]	heart, hearth
	[ə] or [I]	ocean, pageant, sergeant, vengeance
EAU	[o]	beau, bureau, plateau
	[yu]	beauty
OU	[aw]	
	[ə]	
	[(y)u]	
	[ɔ]	
	[o]	
	[U]	could, should, would

References

Berdiansky, B., Cronnell, B., & Koehler, J., Jr. Spelling-sound relations and primary form-class descriptions for speech-comprehension vocabularies of 6-9 year-olds. Technical Report No. 15, 1969, Southwest Regional Laboratory, Inglewood, California.

Burmeister, L. E. Vowel pairs. *Reading Teaching,* 1968, 21, 445-452.

Chomsky, C. Reading, writing, and phonology. *Harvard Educational Review,* 1970, 40, 287-309.

Cronnell, B. Annotated spelling-to-sound correspondence rules. Technical Report No. 32, 1971, Southwest Regional Laboratory, Inglewood, California.

Cronnell, B. Sequenced contractions and abbreviations for Model 2 reading. Technical Memorandum No. TM-2-70-21, 1970, Southwest Regional Laboratory, Inglewood, California.

Cronnell, B. Proper names for use in beginning reading. Research Memorandum, July 14, 1969, Southwest Regional Laboratory, Inglewood, California.

Desberg, P., & Berdiansky, B. Word attack skills: Review of literature. Technical Report No. 3, 1968, Southwest Regional Laboratory, Inglewood, California.

Desberg, P., & Cronnell, B. An instructional sequence for spelling-to-sound correspondences for the one- and two-syllable words in vocabularies of 6-9 year-olds. Technical Report No. 16, 1969, Southwest Regional Laboratory, Inglewood, California.

Jespersen, O. *A modern English grammar on historical principles.* London: George Allen & Unwin Ltd., 1965.

Kenyon, J. S., & Knott, T. A. *A pronouncing dictionary of American English.* Springfield, Massachusetts: G. & C. Merriam Co., 1953.

Kurath, H. *A phonology and prosody of modern English.* Ann Arbor: University of Michigan Press, 1964.

Levin, H., & Watson, J. The learning of variable grapheme-to-phoneme correspondences. *A Basic Research Program for Reading Cornell,* 1963. (a)

Levin, H., & Watson, J. The learning of variable grapheme-to-phoneme correspondences: Variations in the initial consonant position. *A Basic Research Program for Reading Cornell,* 1963. (b)

MacDonald, J. W. Review of *The sound pattern of English* by N. Chomsky & M. Halle. *Harvard Educational Review*, 1969, 39, 180-185.

Marsh, G., & Sherman, M. Children's discrimination and production of phonemes in isolation and in words. Technical Note No. TN-2-70-43, 1970, Southwest Regional Laboratory, Inglewood, California.

Rinsland, H. D. *A basic vocabulary of elementary school children.* New York: Macmillan Co., 1945.

Vachek, J. Two chapters on written English. *Brno Studies in English*, Vol. 1. Prague, 1959, pp. 7-34.

Venezky, R. L. *The structure of English orthography*. The Hague: Mouton & Co., 1970.

Venezky, R. L. English orthography: Its graphical structure and its relation to sound. *Reading Research Quarterly*, 1967, 2, 75-106.

Webster's new world dictionary. Cleveland: World Publishing Co., 1957.

Webster's seventh new collegiate dictionary. Springfield, Massachusetts: G. & C. Merriam Co., 1967.

Williams, J. P. Successive versus concurrent presentation of multiple grapheme-phoneme correspondences. *Journal of Educational Psychology*, 1968, 59, 309-314.